ADA Undercounter Refrigerator Service Manual

i.Series™ and Horizon Series™

Model Group	i.Series	Horizon Series
Blood Bank	iB104-ADA (Version D)	HB104-ADA (Version D)
Laboratory/Pharmacy	iLR104-ADA (Version D)	HLR104-ADA (Version D)

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Document History

Revision	Date	CO	Supersession	Revision Description
A	11 FEB 2013	8268	n/a	Initial release.
B	21 MAR 2013	8338	B supersedes A	► Corrected hysteresis value and refrigerant charge value. ► Corrected part numbers for compressor, unit cooler, and probe bottle kit.

* Date submitted for Change Order review. Actual release date may vary.

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Section I: General Information

1 About this Manual

1.1 Intended Audience

This manual is intended for use by end users of the refrigerator and authorized service technicians.

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “104 models” refers to all models of that size (iB104-ADA, HB104-ADA, iLR104-ADA, HLR104-ADA). This manual covers all undercounter refrigerators, which may be identified singly, by their size, or by their respective “Series.”

1.3 Copyright and Trademark

Helmer®, i.Series®, i.C³®, Horizon Series™, and Rel.i™ are registered trademarks or trademarks of Helmer, Inc. in the United States of America. Copyright © 2013 Helmer, Inc. All other trademarks and registered trademarks are the property of their respective owners.

Helmer, Inc., doing business as (DBA) Helmer Scientific and Helmer.

2 Safety

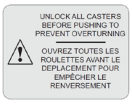
Includes general safety information for refrigerator operation.

2.1 Labels

Caution: Risk of damage to equipment or danger to operator

Caution: Hot surface

Caution: Shock/electrical hazard


UNLOCK ALL CASTERS BEFORE PUSHING TO PREVENT OVERTURNING
OUVREZ TOUTES LES ROULETTES AVANT LE DEPLACEMENT POUR EMPÊCHER LE RENVERSEMENT

Caution: Unlock all casters

Earth / ground terminal

Protective earth / ground terminal

2.2 Avoiding Injury

- ► Review safety instructions before installing, using, or maintaining the equipment.
- ► Do not open multiple, loaded drawers or baskets at the same time.
- ► Before moving unit, ensure casters are free of debris.
- ► Never physically restrict any moving component.
- ► Avoid removing electrical service panels and access panels unless so instructed.
- ► Use supplied power cords only.

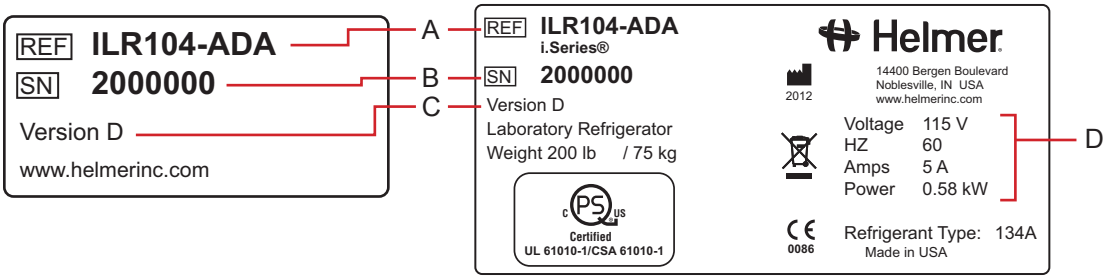
CAUTION Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

3 Configuration

3.1 Model and Input Power

NOTE Service information varies depending on the model and power requirements.

This information appears on the product specification label, located on the rear of the refrigerator. The model also appears on a label located in the chamber on the upper side of the right wall.



Left: Chamber label. Right: Product Specification label (located on the rear at lower left).

Label	Description
A	Model (REF)
B	Serial number (SN)
C	Version
D	Power requirements

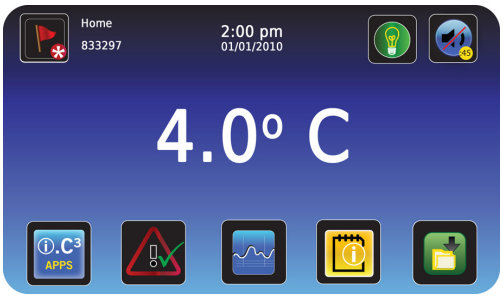
3.2 Control System

NOTE Service information varies depending on the control system.

Helmer refrigerators have one of two control systems installed. The type of control system varies by model.

3.2.1 i.C³® Control System

i.Series refrigerators are equipped with the i.C³ monitoring and control system. The i.C³ system combines temperature control and monitoring into a single interface.



3.2.2 Horizon Series Control System

Horizon Series refrigerators feature the Horizon combined monitor and temperature controller. The Horizon Series system controls chamber temperature and monitors and displays operational information.

3.3 Temperature Probes

Number and location of probes varies by model. External probes may be introduced through existing rear port and immersed in existing probe bottle.

For each probe bottle, use:

► Approximately 4 oz (120 ml) of product simulation solution (10:1 ratio of water to glycerin).

Left: Probe bottle with temperature probe. Right: Access port on rear of refrigerator.

3.3.1 Fill Temperature Probe Bottle

NOTE Temperature probes are fragile; handle with care.

1. Remove all probes from bottle and remove bottle from bracket.
2. Remove cap and fill with approximately 4 oz (120 ml) of product simulation solution.
3. Install cap and place bottle in bracket.
4. Replace probes, immersing at least 2” (50 mm) in solution.

3.3.2 Install Additional Probe Through Rear Port

1. Peel back putty to expose port.
2. Insert probe through port into chamber.
3. Insert probe into bottle.
4. Replace putty, ensuring a tight seal.

3.4 Chart Recorder

If installed, refer to the Temperature Chart Recorder Operation and Service Manual on CD.

The chart recorder has a battery system, enabling a period of continuous operation if power is lost. Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, backup power for the temperature chart recorder is available for up to 14 hours.

Prior to use:

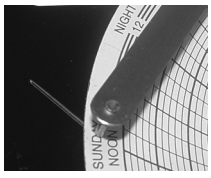
- ► Install battery.
- ► Add paper.
- ► Calibrate chart recorder to match chamber temperature.

3.4.1 Chart Recorder Access

Open door by pulling door open.

3.4.2 Install Chart Paper

1. Press and hold **C** button. When stylus begins to move left, release button. The LED flashes to indicate current temperature range.
2. When stylus stops moving, remove chart knob then move knob up and away.
3. Place chart paper on chart recorder.
4. Gently lift stylus and rotate paper so current time line corresponds to time line groove.



5. Hold chart paper and reinstall chart knob.

NOTE

- ► For accurate temperature reading, ensure that current time is aligned with time line groove when chart knob is tightened.
- ► Do not overtighten knob.

6. Confirm temperature range is set to the correct value.
7. Press and hold **C** button. When stylus begins to move right, release button.
8. Confirm stylus is marking temperature correctly.

4 References and Compliance

4.1 Alarm Reference

If an alarm condition is met, an alarm activates. Some alarms are visual only; others are visual and audible. Some alarms are sent through the remote alarm interface.

The table indicates if an alarm is audible (A), visual (V), or sent through the remote alarm interface (R).

Alarm	Alarm Type
High Temperature	A, V, R
Low Temperature	A, V, R
Compressor Temperature	A, V, R (i.Series)
Door Open (Time)	A, V, R
Power Failure	A, V, R
Low Battery	V (i.Series)
No Battery	A, V, R (i.Series)
Probe Failure	A, V, R
Communication Failure	A, V, R (i.Series)

4.2 Regulatory Compliance

This device complies with the requirements of directive 93/42/EEC concerning Medical Devices, as amended by 2007/47/EC.

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Sound level is less than 70 dB(A).

4.3 WEEE Compliance

The WEEE (waste electrical and electronic equipment) symbol (right) indicates compliance with European Union Directive WEEE 2002/96/EC and applicable provisions. The directive sets requirements for labeling and disposal of certain products in affected countries.

When disposing of this product in countries affected by this directive:

- ► Do not dispose of this product as unsorted municipal waste.
- ► Collect this product separately.
- ► Use collection and return systems available locally.

For more information on the return, recovery, or recycling of this product, contact your local distributor.

5 Warranty

5.1 Rel.i™ Product Warranty USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Have the model and serial number available when calling.

5.1.1 Rapid Resolution

When a warranty issue arises it is our desire to respond quickly and appropriately. The service department at Helmer is there for you. Helmer will oversee the handling of your warranty service from start to finish. Therefore, Helmer must give advance authorization for all service calls and/or parts needs relating to a warranty issue. Any repeat service calls must also be authorized as well. This allows for proper diagnosis and action. Helmer will not be responsible for charges incurred for service calls made by third parties prior to authorization from Helmer. Helmer retains the right to replace any product in lieu of servicing it in the field.

5.1.2 Compressor

For the warranty period listed below, Helmer will supply the refrigeration compressor, if it is determined to be defective, at no charge, including freight. Helmer will not be liable for installation, refrigerant, or miscellaneous charges required to install the compressor beyond the first year of the warranty period.

- ► i.Series model compressor warranty period is seven (7) years.
- ► Horizon Series model compressor warranty period is five (5) years.

5.1.3 Parts

For a period of two (2) years, Helmer will supply at no charge, including freight, any part that fails due to defects in material or workmanship under normal use, with the exception of expendable items. Expendable items such as glass, filters, light bulbs, and door gaskets are excluded from this warranty coverage. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

5.1.4 Labor

For a period of one (1) year, Helmer will cover repair labor costs (including travel) and the cost of refrigerant and supplies necessary to perform authorized repairs. Repair service must be performed by an authorized Helmer service agency following the authorization process detailed above. Alternatively, your facility's staff may work with a Helmer technician to make repairs. Labor costs for repairs made by unauthorized service personnel, or without the assistance of a Helmer technician, will be the responsibility of the end user.

5.1.5 Additional Warranty Information

The time periods set forth above begin two (2) weeks after the original date of shipment from Helmer. Warranty procedures set forth above must be followed in all events.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

This warranty does not cover damages caused in transit, during installation by accident, misuse, fire, flood, or acts of God. Further, this warranty will not be valid if Helmer determines that the failure was caused by a lack of performing recommended equipment maintenance (per Helmer manual) or by using the product in a manner other than for its intended use. Installation and calibration are not covered under this warranty agreement.

5.2 Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: i.Series™ Models

6 Product Configuration

6.1 Install Battery for Backup Power

The monitoring system and chart recorder each have a battery system, enabling a period of continuous operation if power is lost.

NOTE The monitoring system will start on battery power alone. If the refrigerator was previously not connected to AC power and the battery is switched on, the monitoring system will begin running on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, backup power for the monitoring system is available for up to 20 hours (the Low Battery alarm will activate after approximately 18 hours of battery use).

CAUTION

- ► Before installing or replacing batteries, switch the power and battery OFF. Disconnect the refrigerator from AC power.
- ► When installing a replacement battery, use only a battery which meets the specifications outlined in chapter **8.7** (Supplies).

NOTE If AC power is lost, the monitoring system will automatically disable some features to prolong battery power. Data collection will continue until battery power is depleted.

The battery is located below the chamber, behind the front cover. A cover panel must be removed to access the backup battery.

Models	Battery
iB and iLR	(1) rechargeable 12 V lead acid sealed battery

Battery is switched off for shipping. Switch battery on to provide monitoring system with backup power in the event of AC power failure.

6.2 External Monitoring Devices

The remote alarm interface is a relay switch with 3 terminals:

- ► Common (COM)
- ► Normally Open (NO)
- ► Normally Closed (NC)

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used.

Requirements for your alarm system determine which alarm wires must connect to terminals.

NOTE Do not connect any monitoring device that exceeds the maximum load capacity.

The terminals on the remote alarm interface have the following maximum load capacity:

- ► 0.5 A at 125 V (AC): 1 A at 250 V (DC)

6.2.1 Connect to Remote Alarm Interface

1. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2. On back of refrigerator, locate the remote alarm terminals.
3. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
4. Use a cable tie to relieve strain on alarm wires (as necessary).
5. Switch battery switch ON. Switch AC ON/OFF switch ON.
6. Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

6.3 Move Drawers, Shelves, and Baskets

Storage features.

CAUTION

- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum basket, drawer, or shelf load is 100 lbs (46 kg).

NOTE Before moving storage components, protect stored items in refrigerator from extended exposure to adverse temperature.

Remove a Drawer or Basket

1. Pull drawer or basket out until it stops.
2. On the right rail, locate the release tab and press downward.
3. While holding the right release tab downward, locate the release tab on the left rail and press upward.
4. Pull drawer or basket free of the slides.

Install a Drawer or Basket

1. Align end guides on drawer or basket with the slides.
2. Gently push drawer or basket into chamber until it stops.
3. Pull drawer or basket out until it stops; check for smooth operation.

Remove a Shelf

1 With one hand, lift front edge of the shelf from the front brackets.
2 With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a Shelf

1 Insert shelf into chamber, placing it on brackets.
2 Gently bump rear edge of the shelf downward to engage brackets.
3 Pulling shelf forward gently; shelf should not disengage from rear brackets.

6.4 Drawer Labels

Drawer with sample label (not provided).

6.5 Move Slides and Brackets

Remove Drawer Slides

1 Using a screwdriver, remove front bracket retainers.
2 Tap front brackets upward to disengage standards.
3 Remove slides from standards.

Install Drawer Slides

1 Insert slides into standard at appropriate height.
2 Tap front brackets downward to engage standards.
3 Using a screwdriver, install front bracket retainers.

Remove Shelf Brackets

1 Using a screwdriver, remove front bracket retainers.
2 Tap front brackets upward to disengage standards.
3 Remove front brackets from standards.

Install Shelf Brackets

1 Insert front brackets into standard at appropriate height.
2 Tap front brackets downward to engage standards.
3 Using a screwdriver, install front bracket retainers.

6.6 Level the Refrigerator

NOTE

- ► Leveling feet are optional.
- ► Helmer recommends the use of leveling feet.
- ► A bubble level may be used to ensure the refrigerator is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-Back

1 Using a wrench, raise or lower leveling feet.
2 When refrigerator is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-Side

1 Using a wrench, raise or lower leveling feet.
2 When refrigerator is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

6.7 Optional Adapter Kits for Medication Dispensing Locks

Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing locks.

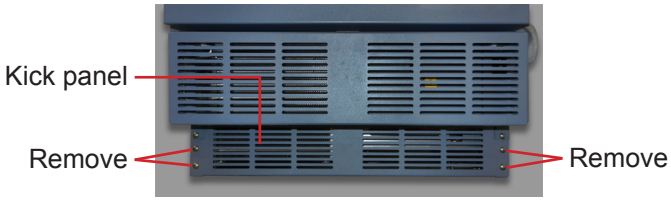
6.8 Reverse Door Hinge and Handle

NOTE

- Before reversing door hinge and handle, protect stored items in refrigerator from extended exposure to adverse temperature.
- Refrigerator must be on the floor or on an elevated work surface with enough space in front of the refrigerator to lay the door face-down for disassembly.
- To reverse the door hinge and handle on refrigerators equipped with Access Control, a handle specific to the opposite side must be installed. Contact Helmer Technical Service to order a replacement handle.

6.8.1 Remove the Door and Hinges

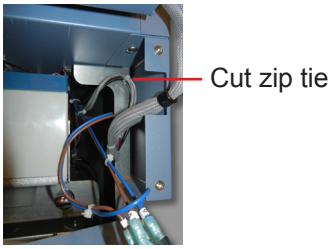
1 Open the lower front control panel. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2 Remove 4 screws holding the kick panel on the cabinet. Set the kick panel aside.



3 Remove 6 screws holding the access panel and cover on the cabinet. Lay the panel in front of the cabinet, ensuring there is no strain on the power switch wires.

4 Remove plug from the access panel (on the handle-side of the cabinet). Remove grommet from the hole (on the hinge-side of the cabinet). Slide the braided sleeve out of the slot (on the kick plate).

5 Cut the zip tie inside the cabinet.



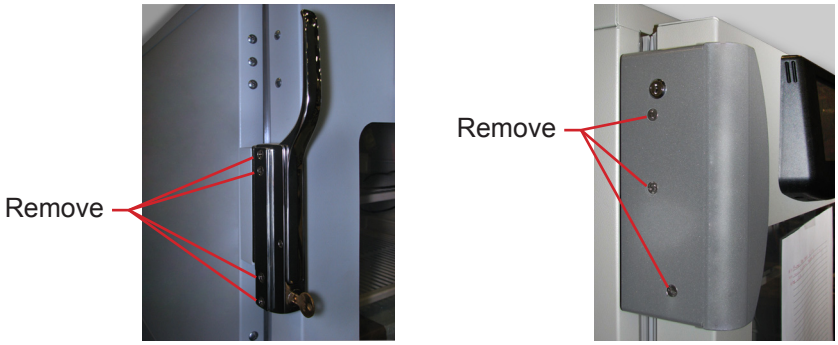
6 Remove the door handle assembly.

Without Access Control:

a Remove 4 screws holding the door handle assembly on the door.
b Set the door handle assembly aside.

With Access Control:

a Remove 3 screws holding the door handle assembly on the door.
b Separate the spade connectors for the Access Control lock.
c Set the door handle assembly aside.



Left: Door handle assembly (without Access Control option). Right: Door handle assembly (with Access Control option).

7 Remove door latch / door catch.

Without Access Control:

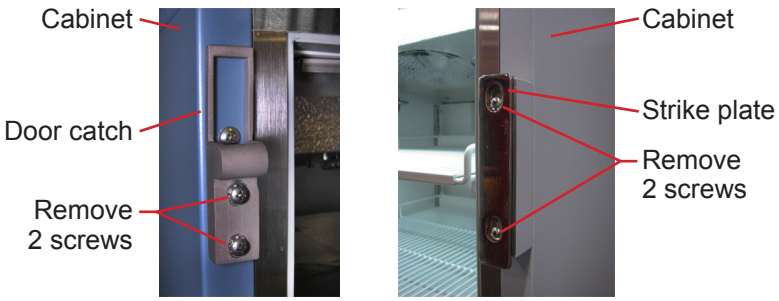
a Remove 2 screws holding the door latch plates and spacer bar on the cabinet

b Set the latch plates and spacer bar aside.

With Access Control:

a Remove 2 screws holding the door catch on the cabinet.

b Set the door catch aside.



Left: Door latch plates (without Access Control option). Right: Door catch (with Access Control option).

8 With the door shut, remove the cover plate from both hinges.

9 Remove the spring assembly from the lower hinge.

a Use a J-hook tool to engage the left-most hole in the spring cap and rotate the spring cap from *left to right,* and hold.

b Remove the pin from the spring cap.

c Allow the spring to relax.

d Use a J-hook tool to engage any hole in the spring cap compress spring downward.

e Remove spring assembly from the lower hinge.

f Set the spring assembly aside.

NOTE

- ► A second person should assist by supporting the door while the hinges are removed.
- ► The 2 screws holding the hinge on the door are longer than the 3 screws holding the hinge on the cabinet. The screws must be installed in the same location when moving the hinge to the opposite side of the door.

---

10 Remove the lower hinge.

a Support the door.

b Remove 5 screws attaching the lower hinge to the door and cabinet.

c Remove the lower hinge.

d Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).

e Set the lower hinge aside.

f Continue to support the door.

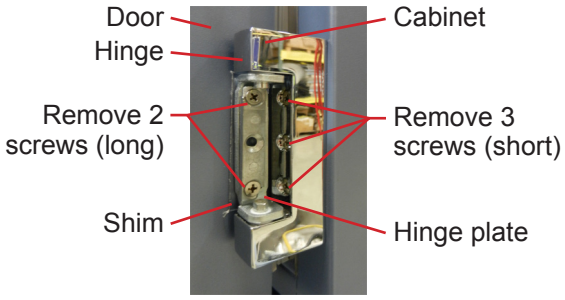
11 Remove the upper hinge.

a Remove 5 screws attaching the upper hinge to the door and cabinet.

b Remove the upper hinge.

c Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).

d Set the upper hinge aside.



Hinge removal (lower hinge shown with spring removed).

12 Lay the door face-down in front of the cabinet. Ensure that there is no strain on the cable(s) passing from the cabinet to the door.

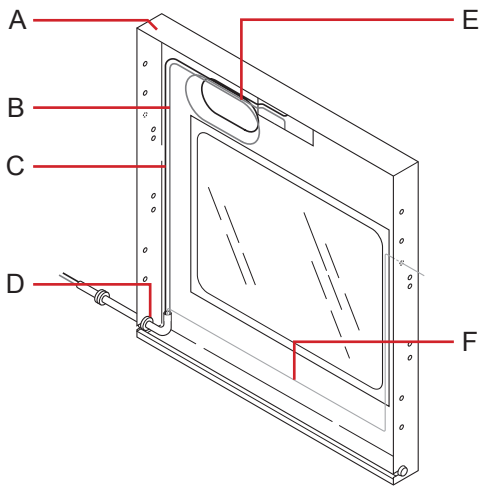
6.8.2 Reverse the Cable Routing in the Door

The door consists of an inner frame and outer frame. The power cable and communication cable are connected to the display circuit board on the front of the door (behind the LCD touchscreen).

The length of the cables inside the door is approximately 3 feet. The cables follow a channel along the top and side of the outer frame. Additional slack has been bundled in the cables.

NOTE The cable routing is the same for glass doors and solid doors.

If the refrigerator is equipped with the Access Control option, a third cable will be included.

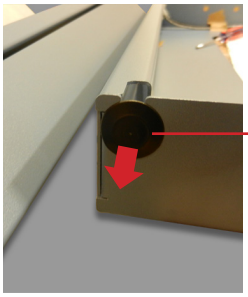


Outer door frame (right-hinged glass door shown), power and communication cables, and optional Access Control cable.

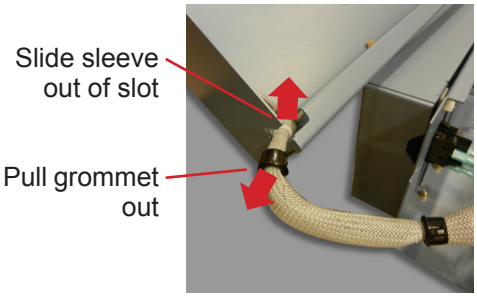
Label	Description
A	Outer door frame
B	Power cable (gray)
C	Communication cable (black)
D	Cable exit (corner of door)
E	Additional cable slack
F	Access Control cable (optional)

1 Lay the door assembly face-down on a solid work surface.
2 Remove remaining screws from both sides of the door assembly.
3 Lift the inner door frame out of the outer door frame and set aside. A J-hook tool may be used along the bottom edge of the door assembly to lift the inner frame.

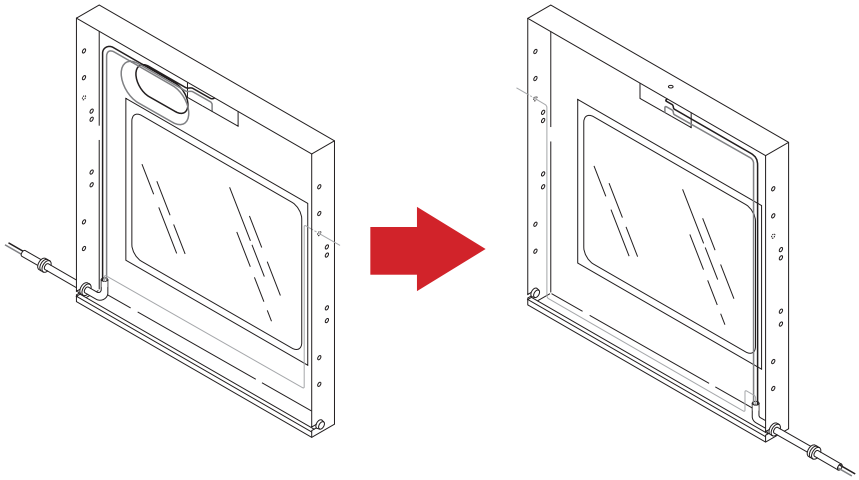
4 Remove the plug from the handle-side of the door. Set the plug aside.



5 Pull the grommet out of the hole in the door. Slide the braided sleeve out of the slot.



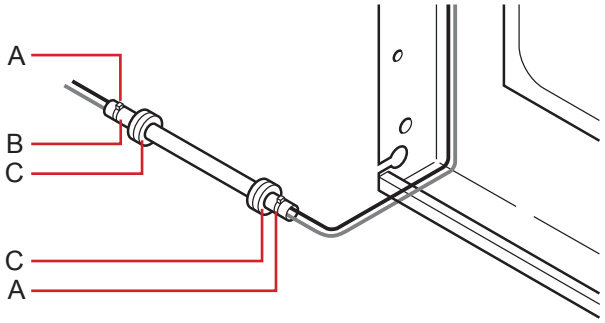
6 Re-route the power cable and communication cables.
   - **a** Route cables inside the door; along the opposite side of the door frame; and out through the slot in the corner opposite from where the cables had previously exited the door.
   - **b** Cables should follow the edge of the door frame, as closely as possible.
   - **c** Tape the cables to the door frame.
   - **d** Excess slack in the cables should be outside of the door.
   - **e** If the refrigerator is equipped with the Access Control option, reverse the installation of the Access Control power cable and tape the cable to the door frame. Use a hammer and center punch to open the knockout hole that the Access Control cable will run through.



Left: Original cable routing (right-hinged door). Right: New cable routing (left-hinged door).

7 Reposition the braided sleeve.

- **a** Cut the zip ties (A) on the braided sleeve (B).
- **b** Slide the sleeve and grommets (C) along the cables, towards the door.
- **c** Slide the braided sleeve through the slot in the door and insert the door-side grommet into the hole in the door.
- **d** Install new zip ties to prevent the braided sleeve from moving along the cables.



Braided sleeve detail.

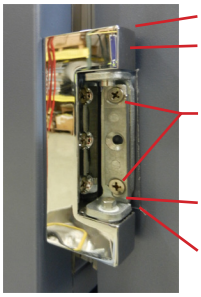
8 Reinstall the inner door frame inside the outer door frame. Install screws in the unused holes on the door where hinges were originally installed.

6.8.3 Reinstall the Door and Hinges

1 Install the hinges and hinge plates on the door.

- **a** Hand-thread 2 screws through each hinge and into the door.
- **b** Leave the screws slightly loose.
- **c** If a shim was used on the lower hinge, transfer the shim to the new hinge location.

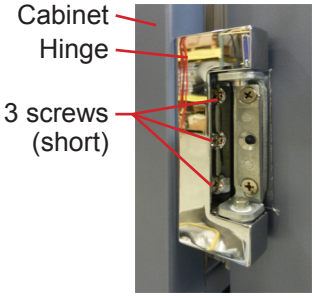
NOTE Ensure that the upper and lower hinges are not interchanged when moving the hinges to the opposite side of the door.



Attach hinge to door (lower hinge shown).

NOTE A second person should assist by supporting the door while the hinges are installed.

2 Install the door on the cabinet.
- **a** Lift the door to the cabinet.
- **b** Align the holes in the hinges with the corresponding holes in the cabinet.
- **c** Hand-thread 3 screws through each hinge and into the cabinet.
- **d** Do not allow the weight of the door to rest on the hinges.

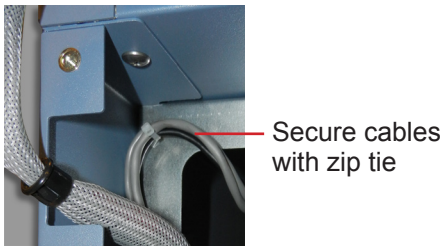


Attach hinge to cabinet (lower hinge shown).

3 Align the door and tighten screws.
- **a** Support the door so the top edge of the door is level.
- **b** Level the door using a shim if necessary.
- **c** Tighten all screws attaching both hinges to the door and to the cabinet.

NOTE If a shim is necessary to level the door after hinge reversal, contact Helmer Technical Service to obtain a shim.

4 Route the power and communication cables (and Access Control cable, if equipped) across the front of the cabinet. Attach the cables to the zip tie holder under the cabinet on the hinge side.



Power and communication cables secured at the hinge-side of the cabinet after hinge reversal.

5 Install the cable in the door.
   - **a** Slide the braided sleeve through the slot in the access panel.
   - **b** Install the grommet in the hole.
   - **c** Install the plug in the access panel on the opposite side.
   - **d** Allow enough slack (approximately 3”) in the braided sleeve between the door and the cabinet so the door can pivot open and closed without straining the cable.

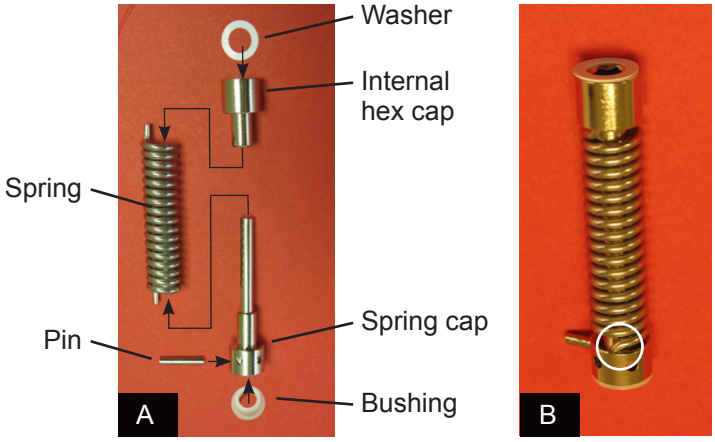
6 Install the access panel and cover.

7 Install the kick panel.

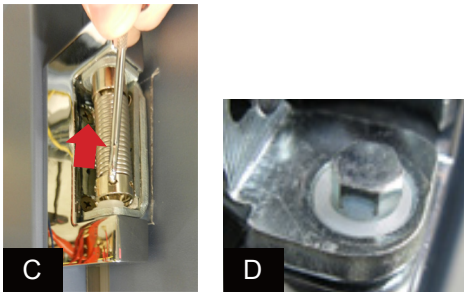
8 Install the door handle on the opposite side of the door. For models equipped with the Access Control option, reconnect the spade connectors for the Access Control lock.

9 Install the latch plates and spacer bar on the opposite side of the cabinet. If the refrigerator is equipped with the Access Control option, install the catch on the cabinet.

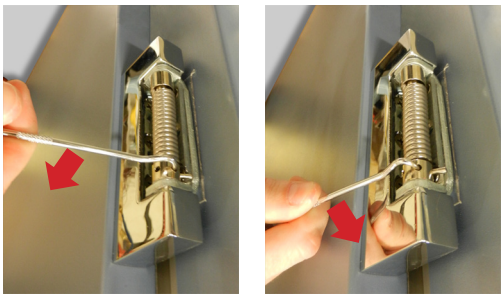
10 Install the hinge spring and pin assembly.
   - **a** Close the door.
   - **b** Assemble the hinge spring assembly for the left side of the door *(Figure A)*.
   - **c** Orient the bend in the coil toward the front of the refrigerator *(Figure B)*.
   - **d** Slide the internal hex cap (with washer) on to the upper hex bolt in the lower hinge.



   - **e** Use a J-hook tool in the spring cap to to compress the spring upward *(Figure C)*.
   - **f** While compressing the spring, slide the spring cap over the lower hex bolt in the lower hinge *(Figure D)*.



   - **g** Use a J-hook tool to engage the right-most hole in the spring cap and rotate the spring cap from *right to left,* and hold.
   - **h** Count 4 holes, starting from and including the spring cap hole closest to the end of the coil.
   - **i** Insert the pin in the fourth hole.



Rotate the spring using a J-hook tool then insert pin (left-hinged door shown).

11 Switch AC ON/OFF switch ON. Switch battery switch ON. Close the lower front control panel.
12 Verify the door is level and the hinges operate smoothly and the door seals tightly.
13 Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.
14 On models equipped with the Access Control option, adjust the catch on the cabinet to engage the Access Control latch on the door.
- **a** Latch should engage the catch on the refrigerator cabinet and prevent the door from being opened.
- **b** If the door closes fully but can be opened, adjust the catch on the cabinet up to engage the latch.
- **c** If the door does not close fully, adjust the catch down to allow the door to close.

6.9 Stacked Undercounter Units

CAUTION

- ► For a stacked configuration, both units must have leveling feet installed.
- ► The back brace bars and front stabilizing brackets must be installed.
- ► When stacking a refrigerator and freezer (104 and/or 105 models), place the heavier unit on the bottom.
- ► Do not open multiple, loaded drawers or baskets at the same time.

Call Helmer or your distributor for more information on the stacking kit, and for methods to secure both units to the wall and/or the floor.

7 Settings

Through the i.C³ monitoring and control system, current settings may be viewed and changed. To view settings, touch **Home**, **i.C³ APPS**, **Settings**. Use a touch-drag motion to scroll up or down to display additional settings.

NOTE

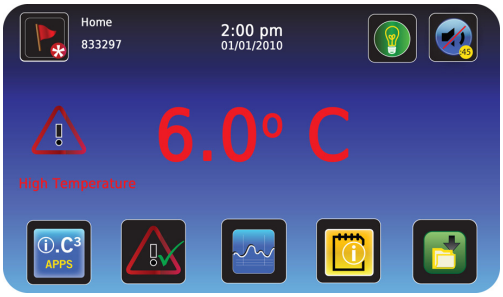
- ► If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.
- ► When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.
- ► Default values for general settings, alarm settings, and display settings are available in the i.C³ User Guide.
- ► Changing temperature settings affects operation of the refrigerator. Do not change settings unless instructed in product documentation or by Helmer Technical Service.

The i.C³ temperature monitor and controller is programmed at the factory. To change a setting, first enter the Settings mode, then the setting. The method for accessing the Settings mode for each setting varies.

7.1 Home Screen

The Home screen appears when:

- ► The **Home** button is touched from any other screen
- ► There is no interaction for two minutes on any screen other than those used to enter a password



7.1.1 Home Screen Functions

NOTE Refer to the i.C³ User Guide for options available on all i.C³ screens.

- ► View current temperature readings
- ► View the current system time and date
- ► Access any of the five customizable applications (touch **i.C³ APPS** for additional applications)
- ► View detailed information about current or previous alarm events or door open data
- ► View whether the monitoring system is running on battery power
- ► Mute audible alarms
- ► Turn the chamber light on and off
- ► View a graph of the chamber temperature

7.2 Temperature Settings

Temperature setpoint values are programmed at the factory. Setpoints can be viewed and changed through the i.C³ monitoring and control system. To view temperature setpoints, touch **Home**, **i.C³ APPS**, **Settings**. Details for each setpoint are displayed.

Temperature Controller Programs screen.

NOTE Default chamber temperature setpoint is 4.0 ºC.

Change the setpoint if:

- ► Your organization requires a chamber temperature other than 4.0 ºC.
- ► The normal chamber temperature is too high or low (after completing preventive maintenance and applicable troubleshooting tasks).

Confirm:

- ► Refrigerator has been placed per location requirements in the operation manual.
- ► Preventive maintenance has been completed per operation manual.
- ► Troubleshooting items associated with chamber temperature have been reviewed (if necessary).

NOTE If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.

Perform the following:

1 Touch **i.C³ APPS**, **i.C³ Settings**.
2 Enter the Settings password.
3 Touch **Temperature Setpoints**.
4 Touch **+** or **–** on the **Temperature Setpoint** spin box.
   ► The setpoint is the temperature at which the refrigerator operates.

EXAMPLE
- ► Current setpoint is 4.0 ºC
- ► Target temperature is 4.5 ºC
- ► Setpoint adjustment value is +0.5 ºC

5 Touch **+** or **–** on the **Hysteresis Setpoint** spin box.
   ► The hysteresis setpoint is the allowable fluctuation in temperature, relative to the temperature setpoint.
   ► A lower hysteresis setpoint will limit the temperature variation to a smaller range.
   ► A higher setpoint will allow the temperature to vary across a larger range.

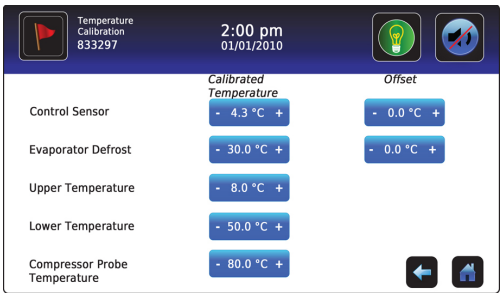
NOTE Hysteresis is factory-preset and should not be changed unless directed by Helmer Technical Service.

6 Touch **+** or **–** on the **Delay on Start-Up** spin box.
   ► Compressor startup is delayed to allow the i.C³ monitoring and control system to start first.
7 Touch **+** or **–** on the **Duty Cycle of Control Relay during Probe Failure** spin box.
   ► The duty cycle is the percentage of time the compressor will run in the event of a temperature control probe failure.

Setting	Initial Factory Value
Temperature Setpoint	4.0 ºC
Hysteresis Setpoint	1.2 ºC (max uniformity models) 0.5 ºC (low humidity models)
Delay on Start-Up	2 minutes
Duty Cycle of Control Relay during Probe Failure	50%

7.3 Temperature Calibration

Temperature calibration values are programmed at the factory. Calibration values can be viewed and changed through the i.C³ monitoring and control system. To view calibration settings, touch **Home**, **i.C³ APPS**, **Settings**. Details for each setting are displayed.



Temperature Calibration screen.

NOTE

- If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.
- When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.
- The Lower Temperature calibration setting is not applicable to undercounter refrigerator models.
- Control Sensor and Control Sensor Offset, Evaporator Defrost and Evaporator Defrost Offset, and Compressor Probe Temperature calibration settings are factory-preset and should not be changed unless directed by Helmer Technical Service.

7.3.1 Control Sensor Offset

The temperature controller senses unit cooler temperature through a probe in the unit cooler. The unit cooler temperature typically varies from the chamber temperature, so an offset value is used by the control system to compensate for the difference.

The temperature controller adjusts chamber temperature around the refrigerator setpoint by activating the compressor when the unit cooler probe registers above the setpoint.

Obtain:

- Independent thermometer, calibrated and traceable per national standards.
- Tape, to attach thermometer to temperature probe.

Perform the following:

1. Remove probe from probe bottle.
2. Unscrew cap from bottle.
3. Tape independent thermometer to temperature probe and place in bottle. Probe and thermometer should be immersed at least 2” (50 mm).
4. Close door and allow chamber temperature to stabilize for 10 minutes.
5. Observe independent thermometer temperature for 10 minutes and determine temperature range.
6. From the range, calculate the average temperature.
7. Remove thermometer and probe from bottle and remove tape.
8. Replace bottle cap, ensuring a tight fit.
9. Place probe in bottle, immersing at least 2” (50 mm).
10. Determine the change in value to reach desired setpoint.

EXAMPLE

- Current setpoint is 4.0 ºC
- Average temperature is 4.5 ºC
- Offset adjustment value is +0.5 ºC

Enter the new offset value:

1 Touch **Home**, **i.C³ APPS**, **Settings**.
2 Enter the Settings password.
3 Touch **Temperature Calibration**.
4 Touch **+** or **–** on the **Control Sensor** spin box.
   ► Value is factory-preset to match the temperature measured in the unit cooler (at the control sensor) by an independent thermometer.

NOTE Control Sensor and Control Sensor Offset are factory-preset and should not be changed unless directed by Helmer Technical Service.

5 Touch **+** or **–** on the **Control Sensor Offset** spin box.
   ► The offset should be equal to the difference between the refrigerator setpoint and the average temperature measured by an independent thermometer (at the probe bottle).
   ► Raise the offset value to lower chamber temperature; lower the offset value to raise chamber temperature.

EXAMPLE
► Measured temperature (at the probe bottle) is 4.0 ºC
► Current setpoint is 4.5 ºC
► Offset adjustment value is +0.5 ºC

6 Touch **Home** to return to home screen.

7.3.2 Calibrate Chamber Temperature Probe

Verify temperature probe is reading chamber temperature correctly by comparing chamber probe reading to temperature read by an independent thermometer. If chamber temperature probe is not reading correctly, change the value displayed on the monitor.

NOTE
► If the variance is within acceptable limits, changing the offset value is optional.
► Probe in the bottle is connected to the monitoring system and senses chamber temperature. This probe do not affect refrigerator setpoint.

► Default setting for chamber temperature probe is 4.0 ºC.
► Value is factory-preset.
► Value can be changed from -100.0 ºC to +50.0 ºC.

Obtain:

► Independent thermometer, calibrated and traceable per national standards.
► Tape, to attach thermometer to temperature probe.

Calibrate probe:

1 Remove probe from the probe bottle.
2 Unscrew the cap from the bottle.
3 Tape the thermometer to the temperature probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4 Close the door and allow the chamber temperature to stabilize for 10 minutes.
5 Observe and note the thermometer temperature.
6 Touch, **i.C³ APPS**, **Settings**, **Temperature Calibration**.
7 Touch **+** or **–** on the **Upper Temperature** spin box to increase or decrease the value to match the measured value. The message “New Setting Saved” appears next to the spin box.

NOTE After saving the new temperature value, the displayed temperature may not match the new value. This is normal.

8 Replace the probe in probe bottle.
9 Remove thermometer and probe from bottle and remove tape.
10 Replace bottle cap, ensuring a tight fit.
11 Place probe in bottle, immersing at least 2” (50 mm).

7.3.3 Calibrate Compressor and Evaporator Probe

The compressor and evaporator temperature probes have been factory-calibrated. Calibration settings should not be changed unless directed by Helmer Technical Service.

7.3.4 Factory Default Settings

Settings listed below may be simultaneously returned to factory default values.

NOTE The factory default settings may not be the same as the settings that were factory-calibrated before the refrigerator was shipped.

Setting	Restored Value
Home Screen Application Icons	i.C³ APPS, Temperature Alarm Test, Temperature Graph, Information Logs, Download
Display Brightness	High (3 symbols)
Password (for Settings screen)	1234
Sounds	On
Alarm Volume	9
Alarm Tone	On
Temperature Calibration Values	Values previously entered during setup
Unit ID	Serial number entered at factory
Date Format	MM/DD/YYYY
Day	Not affected (maintained in real-time clock)
Month	
Year	
Time Format	12-hour
Minute	Not affected (maintained in real-time clock)
Hour	
AM/PM	
Language	Language previously selected during setup
Temperature Units	ºC
Password Protection (for Settings screen)	On
Temperature Graph Screensaver	On
Access Control (optional) as Home Page	On
Light Off Delay (on/off)	On
Light Off Delay	5 minutes
High Temperature Alarm Setpoint	5.5 ºC
High Temperature Alarm Time Delay	0 minutes

Setting	Restored Value
Low Temperature Alarm Setpoint *	1.5 ºC
Low Temperature Alarm Time Delay	0 minutes
Power Failure Alarm Time Delay	1 minute
Probe Failure Alarm Time Delay	0 minutes
Door Open (Time) Alarm Time Delay	3 minutes
Compressor Temperature Alarm Setpoint	50.0 ºC
Compressor Temperature Alarm Time Delay	0 minutes
Chamber Setpoint	4.0 ºC
Chamber Hysteresis	1.2 ºC (max uniformity models) 0.5 ºC (low humidity models)
Delay on Start-Up	2 minutes

* This includes laboratory/pharmacy (iLR) models that were originally set at 2.0 ºC.

7.3.5 Additional Factory Default Settings for Laboratory and Pharmacy Models

Setting	Restored Value
Control Relay Probe Failure Duty Cycle	50%
Defrost Event #1 On/Off	Off
Defrost Event #1 Start Time	12:00 AM
Defrost Event #2 On/Off	On
Defrost Event #2 Start Time	6:00 AM
Defrost Event #3 On/Off	Off
Defrost Event #3 Start Time	12:00 PM
Defrost Event #4 On/Off	On
Defrost Event #4 Start Time	6:00 PM
Defrost Time/Defrost Safety Operation Time	10 minutes

NOTE Defrost event settings are only applicable to laboratory/pharmacy (iLR) refrigerators.

7.3.6 Restore Factory Default Settings

1 Touch **Home**, **i.C³ APPS**, **Settings**, **Restore Factory Settings**.

2 A “Are you sure you want to restore factory settings?” message appears. Do one of the following:

- ► Touch **Yes**. The message screen closes and factory settings are restored.
- ► Touch **No**. The message screen closes and factory settings are not restored.

7.3.7 Change Factory Settings

Several of the refrigerator operating parameters are configured at the factory. The settings listed below are set at the factory, and may be changed at the direction of Helmer Technical Service.

Setting	Description
Light Icon	Toggle the light icon on or off
Temperature Controller Page	Enable or disable the temperature controller screen

Factory settings may be viewed and changed. Contact Helmer Technical Service to verify if changing factory settings is necessary, and for instructions in accessing Factory Settings screen.

7.4 Test Alarms

Test alarms to ensure they are working correctly. The refrigerator has alarms for chamber temperature, compressor temperature, door open (time), power failure, low battery, and power failure.

7.4.1 Automatic Chamber Temperature Alarm Test

NOTE

- Test can be aborted by touching **Cancel Test**.
- Test takes less than 5 minutes.
- If the temperature alarm test does not automatically complete within 2 minutes, restart the i.C³ monitoring system.

When performing an automatic temperature alarm test, the Peiltier device heats or cools the temperature probe until the high or low alarm setpoint is reached. An event is added to the Event Log to indicate a temperature alarm was activated. The Alarm Test icon is displayed on the Temperature Graph to indicate the temperature alarm was test-induced.

Test the low alarm:

1. Identify current setting for low alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **Low Alarm Test**.
4. “Peltier Test Probe Cooling” message appears.
5. When displayed temperature reaches the alarm setpoint, temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the low temperature alarm event. Compare this to the alarm setpoint. If values do not match, refer to chapter **9** (Troubleshooting).

Test the high alarm:

1. Identify current setting for high alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **High Alarm Test**.
4. “Peltier Test Probe Warming” message appears.
5. When displayed temperature reaches the alarm setpoint, the temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the high temperature alarm event. Compare this to the alarm setpoint. If values do not match, refer to chapter **9** (Troubleshooting).

Cancel the test:

1 Touch **Home**, **i.C³ APPS, Temperature Alarm Test**.
2 Touch **Cancel Test**.

NOTE When cancelling an automatic test, the message indicating the test is in progress clears immediately. If a setpoint was reached before the test was cancelled, the alarm activates and clears as described earlier.

7.4.2 Manual Chamber Alarm Test

IMPORTANT Perform the low alarm test before the high alarm test to control the temperature more closely and complete the testing more quickly.

NOTE Before testing alarms, protect items in refrigerator from extended exposure to adverse temperature.

Obtain:

- (2) 8 oz (250 ml) glass half-full of chilled water.
- (1) glass filled with crushed ice.
- (1) 8 oz (250 ml) glass half-full of warm water.

NOTE Temperature probes are fragile; handle with care.

Test the low alarm:

1 Identify setting for low alarm setpoint.
2 Remove chamber temperature probe from bottle.
3 Immerse probe in chilled water.
4 While stirring probe in chilled water, add approximately 1 teaspoon (5 ml) of ice every 20 seconds. Ensure probe is at the bottom of the glass.
5 When low temperature alarm sounds, note the temperature on the i.C³ display.
6 Compare the temperature at which the alarm sounds to the low alarm setpoint. If values do not match, refer to chapter **9** (Troubleshooting).

Test the high alarm:

1 Identify setting for high alarm setpoint.
2 While stirring probe in chilled water, add warm water so temperature increases 0.5 ºC per minute.
3 When high temperature alarm sounds, note the temperature on the i.C³ display.
4 Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to chapter **9** (Troubleshooting).
5 Remove probe from warm water.
6 Place temperature probe in probe bottle, immersing it at least 2” (50 mm).

7.4.3 Power Failure Alarm Test

NOTE During a power failure, the power failure alarm sounds and the battery provides power to the monitoring system.

1 Change Power Failure delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** or **–** on the Power Failure spin box to change the value to 0.
2 Switch AC ON/OFF switch OFF. Power failure alarm will activate immediately.

3 Switch AC ON/OFF switch ON. Power failure alarm will clear and audible alarm will cease.
4 Change Power Failure time delay to the original setting.

7.4.4 Door Open Alarm Test

1 Change Door Open (Time) delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** or **–** on the Door Open (Time) spin box to change the value to 0.
2 Open door. Alarm will activate immediately.
3 Close door. Alarm will clear and audible alarm will cease.
4 Change the Door Open (Time) setting to the original setting.

7.5 Upgrade System Firmware

Helmer may occasionally issue updates for the i.C³ firmware. Follow upgrade instructions included with the firmware update.

7.6 Calibrate the Touchscreen

The i.C³ touchscreen has been calibrated at the factory to ensure that when the screen is touched, the desired key touch is selected. If the i.C³ touchscreen or display circuit board is replaced after the refrigerator has been shipped from the factory, the touchscreen must be recalibrated. If the screen must be recalibrated, contact Helmer Technical Service to obtain the calibration file.

Calibrate the screen:

1 Insert the flash memory device with the calibration program into the USB port on the i.C³ bezel. The flash memory device can be inserted while any screen displayed on the i.C³.
2 Wait 15 to 30 seconds for the calibration file to load.
3 When the calibration screen appears, remove the flash memory device from the USB port.
4 Follow the on-screen instructions, touching the crosshair icons as they appear on the screen.

NOTE For accurate calibration results and to avoid damage to the touchscreen, touch the crosshairs with the eraser end of a pencil.

5 After all crosshairs have been touched, the i.C³ will reboot and display the language screen.

NOTE
- ► For accurate calibration results and to avoid damage to the touchscreen, touch the crosshairs with the eraser end of a pencil.
- ► If the screen was unintentionally touched outside of any of the crosshair icons during calibration, the screen may be recalibrated using the process outlined above.

7.7 View Manufacturer and Product Information

View version information for contacting Helmer.

1 Touch **i.C³ APPS**, **Contact Helmer**.
2 Manufacturer contact information appears.
3 Software version appears.

8 Maintenance

NOTE

- ► Refer to the operation manual for the preventive maintenance schedule.
- ► Before performing maintenance, protect items in refrigerator from extended exposure to adverse temperature.
- ► Allow refrigerator temperature to stabilize at setpoint after performing serivce or after extended door opening.

8.1 Recharge Refrigerant

CAUTION

- ► Review all safety instructions prior to recharging refrigerant. Refer to chapter **2** (Safety).
- ► Maintenance should only be performed by trained refrigeration technicians.

NOTE Use only non-CFC R-134A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Power Requirements	Initial Charge
104-ADA model	115 V	4.5 oz (128 g)

Obtain:

- ► Refrigerant
- ► Calibrated pressure gauge (0 lbs/in² to 25 lbs/in² (0 kPa to 175 kPa))

Add refrigerant:

1 Attach pressure gauge to the fittings on the refrigeration lines.
2 Monitor the low side (suction) pressure through a full compressor cycle.
3 Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant. Check the pressure on the low side.
   - ► Low side = 12 lbs/in² to 14 lbs/in² (83 kPa to 97 kPa)

5 Remove pressure gauge.

8.2 Check Monitoring System Battery

On all i.C³ screens, the Battery icon will appear in the header bar when the system is running on battery power and the screen brightness will automatically be reduced. The monitoring system will automatically disable some features to extend battery life.

Check the battery:

1 Switch AC ON/OFF switch OFF.
   a Screen should continue to display information with reduced brightness.
   b Battery icon will appear on the screen.
   c If the display is blank, replace battery.
2 Switch AC ON/OFF switch ON.

NOTE Use a battery which meets specifications outlined in chapter **8.7** (Supplies).

8.3 Replace LED Lamp Strip

NOTE The display assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Refer to chapter 2 (Safety) prior to replacing the display assembly.

1. Switch battery switch OFF. Switch AC ON/OFF switch OFF.
2. Using a screwdriver, detatch lamp strip from chamber.
3. Unsnap the defective lamp strip and disconnect wires.
4. Connect new lamp strip to the wires.
5. Reattach lamp strip to chamber.
6. Switch AC ON/OFF switch ON Switch battery switch ON.
7. Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

8.4 Clean the Refrigerator

8.4.1 Condenser Grill

CAUTION Disconnect refrigerator from AC power when cleaning.

In environments where refrigerator is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

8.4.2 Exterior

Clean glass surfaces with soft cotton cloth and glass cleaner. Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

8.4.3 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

8.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

8.4.5 Clean and Refill Probe Bottle

NOTE A kit that includes a probe bottle and glycerin is available from Helmer.

Obtain:

- Fresh water-bleach solution (not provided)
  - 1:9 ratio of bleach to water
  - Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- 4 oz (120 ml) of product simulation solution per bottle
  - 10:1 ratio of water to glycerin

Clean and refill bottle:

1 Remove probe from bottle.
2 Remove bottle from bracket.
3 Clean bottle with water-bleach solution.
4 Fill bottle with 4 oz (120 ml) of product simulation solution.
5 Cap bottle tightly to minimize evaporation.
6 Place bottle in bracket.
7 Replace probe, immersing at least 2” (50 mm).

8.4.6 i.C³® Touchscreen

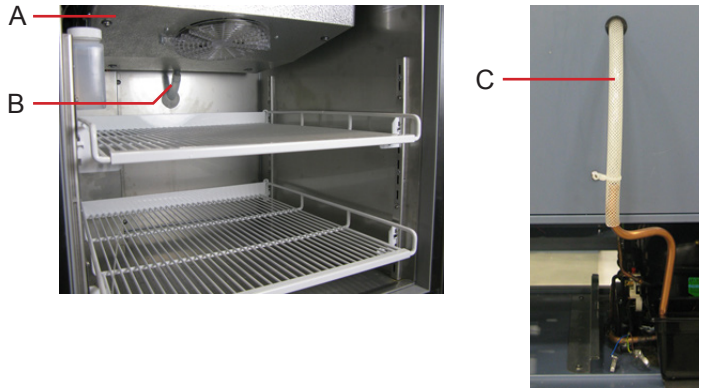
Clean touchscreen with a soft, dry cotton cloth.

8.5 Unit Cooler Cover Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and refrigerator’s inability to maintain temperature.

Required tools:

► 5/16” socket wrench
► Tool to push putty away from the drain hose



Drain line and hose.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain hose

8.5.1 Remove the Unit Cooler Cover

1 Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2 On the back of the cabinet, peel the putty back to expose the drain hose (C).
3 Remove top drawer, basket, or shelf from the chamber.
4 Remove drain hose from unit cooler drain port (B).
  a Pull drain hose downward to separate from unit cooler.
  b Twist drain hose while pulling to assist in removal.
5 Push the drain hose (C) out through rear of chamber.

6 Remove the unit cooler cover.
   a Hold unit cooler cover in place to prevent it from dropping.
   b Use the socket wrench to remove 4 screws securing the unit cooler cover.
   c Carefully lower unit cooler cover to avoid damage to the fan wiring.

8.5.2 Install the Unit Cooler Cover

1 Verify unit cooler wiring is connected and routed correctly.
   a Wiring should be routed above copper tube inside the unit cooler.
   b Reconnect wires if they have separated.
2 Attach unit cooler cover.
   a Lift unit cooler cover into place.
   b Front edge of the cover should be behind the unit cooler case.
   c Use the socket wrench to install 4 screws to secure the unit cooler cover.
3 Insert the drain hose through hole in the refrigerator.
   a Push drain hose upward, toward the unit cooler drain port.
   b In the chamber, push drain hose onto unit cooler drain port.
4 Reinstall top drawer, basket, or shelf if previously removed.
5 On the back of the cabinet, press putty around the drain hose.
6 Switch AC ON/OFF switch ON. Switch battery switch ON.
7 Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

8.6 Access Control Cartridge Removal and Installation

The Access Control lock cartridge is a serviceable assembly installed on the cabinet.

Required tools:

- ► Needle nose pliers
- ► #10 spanner driver

8.6.1 Cartridge Removal

1 Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2 Open refrigerator door and prop the door open.
   ► If door is locked, use the key to override the Access Control lock, then open door.
3 Pull the electrical wiring out of the door handle to expose the spade connectors.
4 Separate the two pairs of spade connectors.
5 Use a #10 spanner driver to remove 3 screws securing the door handle and cartridge.

5 Remove the door handle and cartridge.

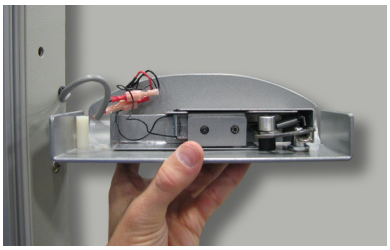
NOTE

- ► Nylon spacers are installed over the middle and lower screws, between the handle and the door. These spacers will be reused when the new cartridge is installed.
- ► To obtain a #10 spanner driver (part number 220559), contact Helmer Technical Service.

8.6.2 Cartridge Installation

1 Place the cartridge inside the handle.

► Align the holes in the cartridge with the holes in the handle.



Access Control cartridge aligned with corresponding holes in the handle.

2 Insert upper screw through:

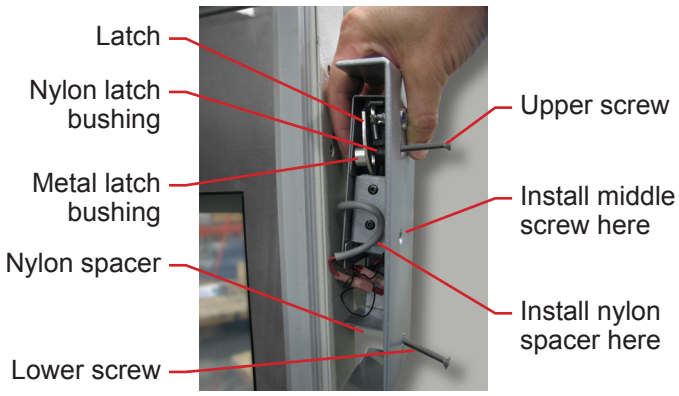
- **a** Upper hole in handle
- **b** Door latch
- **c** Latch bushings
- **d** Cartridge body

3 Insert lower screw through:

- **a** Lower hole in handle
- **b** Nylon spacer

4 Place the assembly against the door.

- **a** Align the screw with the corresponding hole in the door.
- **b** Hand-thread the screw into the hole in the door.



5 Install the middle screw.

- **a** Use needle nose pliers to hold the nylon spacer inside the door handle.
- **b** Align nylon spacer with the middle hole in the handle.
- **c** Insert a screw through the handle and the spacer.
- **d** Hand-thread screw into the door.

6 Install the lower screw.
   a Use needle nose pliers to hold the nylon spacer inside the door handle.
   b Align nylon spacer with the lower hole in the handle.
   c Insert a screw through the handle and the spacer.
   d Hand-thread screw into the door.

NOTE Ensure the wires will not be pinched between the handle and the door.

7 Use a #10 spanner driver to tighten all 3 screws.
8 Connect the electrical wires from the door to the wires from the cartridge.
   ► Tuck the excess wiring into the door handle.
9 Close refrigerator door.
10 Switch AC ON/OFF switch ON. Switch battery switch ON.
11 Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.
12 Check for proper engagement of the latch over the catch.
   a Latch should engage the catch on the refrigerator cabinet and prevent the door from being opened.
   b If the door closes fully but can be opened, adjust the catch on the cabinet *up* to engage the latch.
   c If the door does not close fully, adjust the catch down to allow the door to close.

8.7 Supplies

Refrigerant: non-CFC, R-134A

Chart paper: 220366 (52 sheets)

Glycerin solution: 400922-1

LED lamp strip: 800023-1, ≈ 3 W

(1) 12 V, 7 Ah rechargeable sealed lead acid battery: 120628

(1) 9 V non-rechargeable alkaline (or equivalent) battery: 120218

9 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).

9.1 General Operation Problems

Problem	Possible Cause	Action
A drawer or basket does not slide easily.	Debris in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of debris. Clean if necessary.
	Drawer slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	Drawer or basket is misaligned or not level.	► Confirm both slides for the drawer or basket are mounted at the same height.
	Drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
A door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Hinge is faulty.	► Confirm the hinge spring or pin is not damaged. Replace entire hinge (lower hinge only), if necessary.
	Lower hinge spring and/or pin may be bent or faulty.	► Replace the entire lower hinge spring and pin assembly.
The monitor display is hard to read.	Screen brightness is set too low.	► Change the screen brightness.
The alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
“Probe Failure” is displayed on the monitor.	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections if necessary. ► Confirm the probe is providing resistance in the range of 86 Ω to 110 Ω. Replace the probe if necessary.

9.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Chamber temperature probe is not calibrated.	► Check the chamber temperature calibration. Change the calibration if necessary.
	Connections for the chamber temperature probe are loose.	► Test the chamber probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	Probe bottle is empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottle. Clean and refill the bottle if necessary.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
	Monitor is not calibrated.	► Confirm the temperature probe is reading correctly. Calibrate the chamber probe if necessary.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	Temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	Refrigerator setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature controller is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the refrigerator setpoint.	Temperature controller is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	Circulation in the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the refrigerator is too high.	► Confirm refrigerator location meets requirements. Refer to operation manual.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

9.3 Alarm Activation Problems

Problem	Possible Cause	Action
The refrigerator is in an alarm condition, but alarms are not audible.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Audible alarms are muted.	► Verify that audible alarms are not muted. If time remaining is greater than 5 minutes, change MUTE timer value to 5 minutes and wait until timer resets.
The refrigerator meets an alarm condition, but the appropriate alarm is not active.	Control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the chamber temperature probe are loose.	► Test the chamber temperature probe connections. Secure the connections if necessary.
	Chamber probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottle is empty.	► Check the level of product simulation solution in the bottle. Clean and refill bottle if necessary.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The refrigerator is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Circuit breaker is tripped.	► Reset or replace the circuit breaker.

Problem	Possible Cause	Action
The Door Open alarm is activating sporadically.	Door is not closing completely.	► Clean hinges if debris is present. ► Confirm door is aligned. ► Confirm hinge spring and/or pin are not damaged. Replace hinge (lower only) if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Door Ajar Timeout is set to zero, causing the alarm to activate immediately when the door is opened.	► Check the current setpoint for the Door Ajar alarm. Change the setpoint if necessary.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if necessary. ► Confirm refrigerator location meets requirements.
	Condenser alarm setpoint is too low.	► Confirm the alarm setpoint is set at the expected or correct value.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.

Problem	Possible Cause	Action
The condenser alarm is active.	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check refrigerant level. Recharge if low.
	Connections for the condenser temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Condenser temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Condenser fins are dirty.	► Clean as necessary, or order new ones from Helmer or your distributor.
	The compressor is overheating due to a lack of air flow.	► Check the condenser grill and clean if necessary. ► Confirm the refrigerator is correctly located. Refer to the operation manual.
	Condenser probe is not calibrated.	► Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	The condenser alarm setpoint is too low.	► Confirm the alarm setpoint is at the appropriate value.
	The condenser fan motor is faulty.	► Replace the condenser fan motor.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
An alarm is activated but the temperature recorded at activation does not match the alarm setpoint.	The monitor settings are not calibrated.	► Confirm the temperature probe is reading correctly. Calibrate the probe if necessary.
	The temperature changed slightly around the time of activation.	► No action necessary.
The No Battery alarm is activating sporadically.	The battery voltage level on the backup batteries for the monitoring system is low.	► Replace the backup batteries for the monitoring system.

9.4 Testing Problems

Problem	Possible Cause	Action
The automatic temperature tests do not work.	Connections for the chamber temperature probe are loose.	► Test the chamber temperature probe connections. Secure the connections if necessary.
	Chamber temperature probe is faulty.	► Test the chamber temperature probe. Replace the probe if necessary.
	Control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	High Alarm setpoint is set significantly higher than the default value, or the Low Alarm setpoint is set significantly lower than the default value.	► Confirm the alarm setpoints are set at the expected or correct values. ► Test the temperature alarms manually.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

9.5 Condensation Problems

Problem	Possible Cause	Action
There is excessive water in the water evaporation tray inside the lower compartment in the back of the unit.	Humid air is entering the chamber	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
There is excessive water in the chamber.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Connection between the unit cooler and the drain tube is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
There is excessive moisture on the doors.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around refrigerator is too high.	► Confirm refrigerator location meets requirements.
Water leaks from the bottom of the refrigerator.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Excessive water is found in the evaporation tray inside the refrigerator.	► Contact Helmer Technical Service to correct issues as necessary.

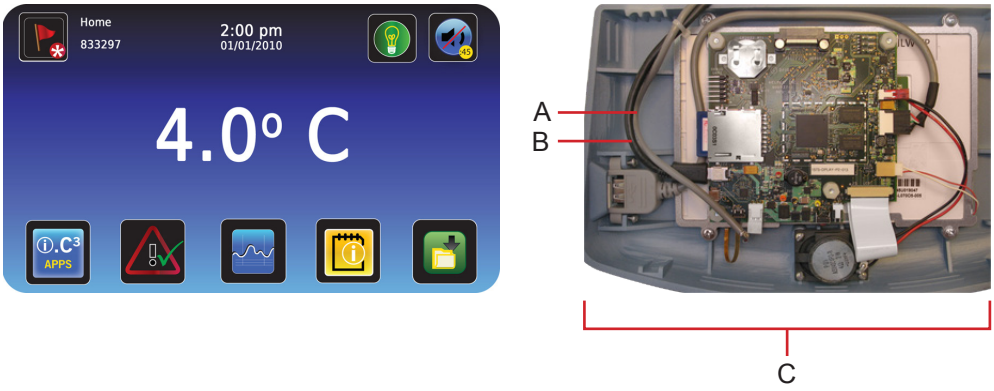
10 Parts

NOTE

- Before replacing parts, protect items in refrigerator from extended exposure to adverse temperature.
- Allow refrigerator temperature to stabilize at setpoint after replacing parts or after extended door opening.

10.1 Front

10.1.1 Control System Display



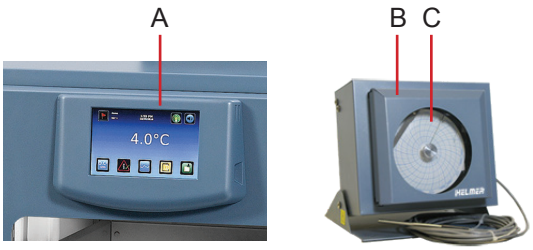
Left: Front view, LCD touchscreen. Right: Rear view showing display board.

Label	Description	Part Number	Schematic Label
A	Interface cable	800010-1	IG
B	Power cable	800010-1	IH
C	Display assembly (includes touchscreen, display board, interface cable, speaker)	800041-1	IQ

NOTE

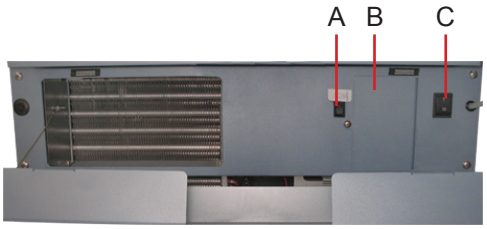
- The i.C³ display assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the display assembly.
- Although the touchscreen and display board may be replaced independently of the i.C³ display assembly, Helmer recommends replacing the complete assembly.

10.1.2 Control and Monitoring



Label	Description	Part Number	Schematic Label
A	i.C³ monitoring and control system	-	-
B	Temperature chart recorder (standard on blood bank model; optional on laboratory / pharmacy model)	500612-1	-
C	Chart paper (52 sheets)	220366	-
Not shown	Chart recorder backup battery	120218	-

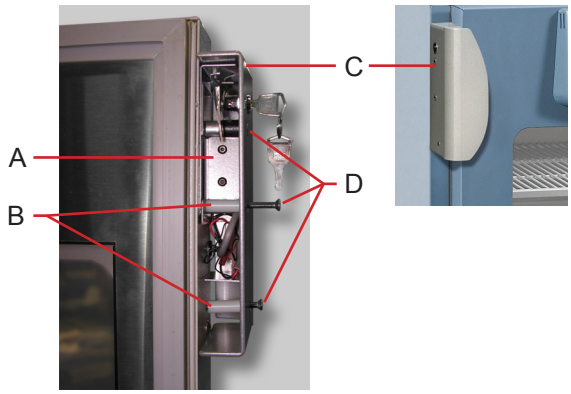
10.1.3 Lower Panel



Lower panel features.

Label	Description	Part Number	Schematic Label
A	Battery switch	120202	IC
B	Battery access door	-	-
Not shown	Monitoring system backup battery	120628	IB
C	Main power switch	120478	C

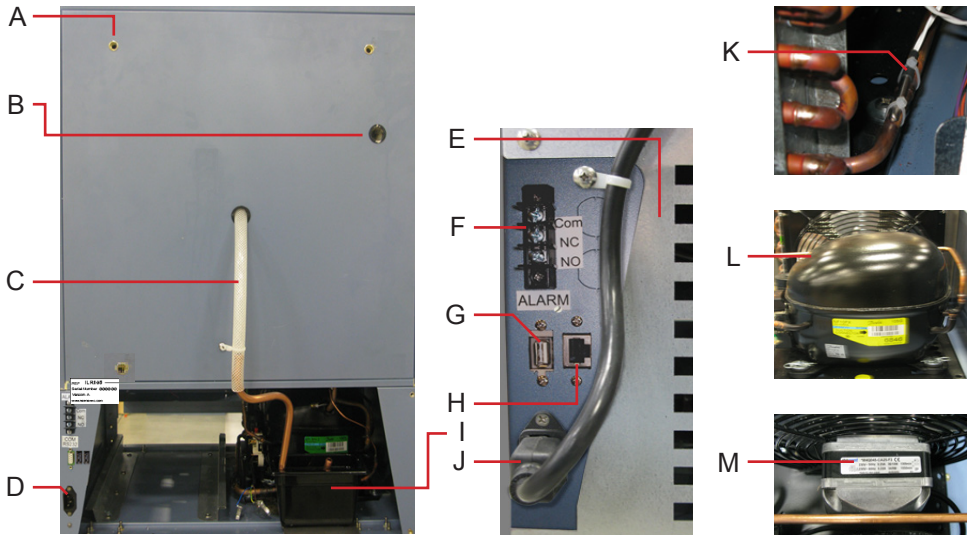
10.1.4 Access Control Option



Access Control cartridge and door handle.

Label	Description	Part Number	Schematic Label
A	Access Control cartridge	Left-hinged door: 400959-1 Right-hinged door: 400959-2	II
B	Nylon spacer	-	-
C	Door handle with keyed lock (lock functions as manual override)	Left-hinged door: 800021-1 Right-hinged door: 800021-1	-
D	Screw	-	-

10.2 Rear

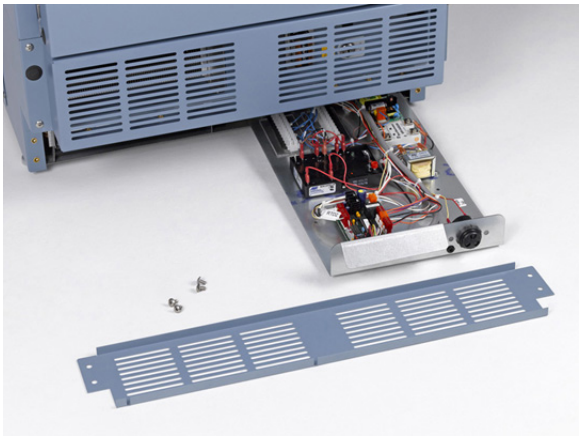


Rear features.

Label	Description	Part Number	Schematic Label
A	Nut flanges for brace bars used in stacking undercounter units (two shown)	-	-
B	Rear access port	-	-
C	Drain line	321190-1	-

Label	Description	Part Number	Schematic Label
Not shown	Cover for communication ports and remote alarm contacts	-	-
D	Power connector	-	-
E	Rear cover	321184-1	-
F	Remote alarm contacts	-	-
G	USB port	120638	IE
H	RJ-45 Ethernet port	800008-1	IF
Not shown	RS-232 COM port (optional)	-	-
I	Condensate evaporator tray	-	-
J	Power cable (with connector)	120630	A
K	Condenser probe	400674-1	IL
L	Compressor	800129-1	J
M	Condenser fan motor	120608	K
Not shown	Caster (optional, swivel with brake)	220467	-

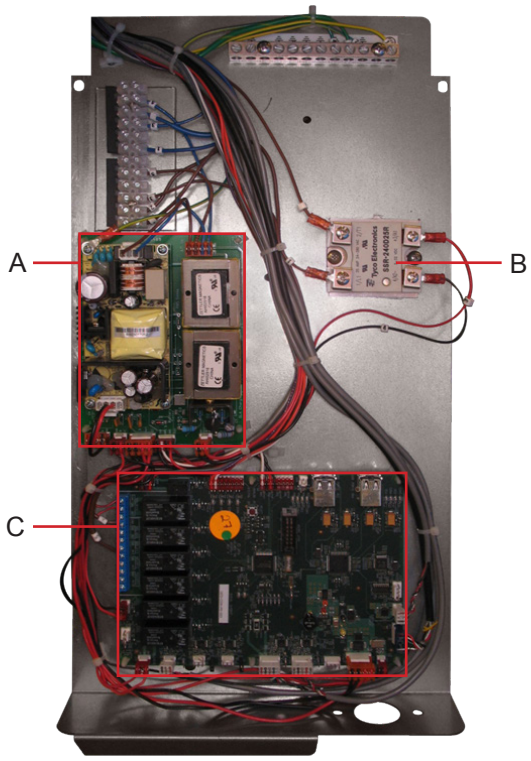
10.3 Electrical Tray



Kick plate (removed). Pull-out electrical components tray (open).

CAUTION Disconnect the refrigerator from AC power before accessing the electrical tray.

10.3.1 Electrical Tray Components



Electrical tray features.

Label	Description	Part Number	Schematic Label
A	Power supply board	800035-1	ID
B	Compressor relay	120426-1	L
C	i.C³ control board	800034-1	IA
Not shown	Power line filter	120299	D
Not shown	Compressor power line filter	120706	V

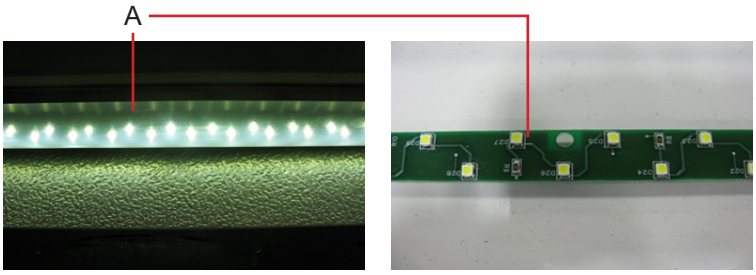
NOTE The i.C³ control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

10.4 Interior

Interior features.

Label	Description	Part Number	Schematic Label
A	Door	**Solid door** Stainless steel: 401090-1 Powder coated: 401089-1 **Glass door (optional)** Stainless steel: 401088-1 Powder coated: 401087-1	-
B	Drawer (blood bank model)	401082-1	-
C	Door switch	120380	M
D	Roll-out basket (optional)	401133-1	-
E	Standard for shelf, drawer, or roll out basket	321638-1	-
F	Chamber temperature probe	800038-1	IK
G	Drawer slide for drawer or roll out basket	400753-2	-
H	Probe bottle and glycerin kit	800132-1	-
I	Shelf (laboratory / pharmacy model)	400814-1	-
Not shown	Optional adapter kit for medication dispensing lock	Call Helmer or your distributor for specific information	-

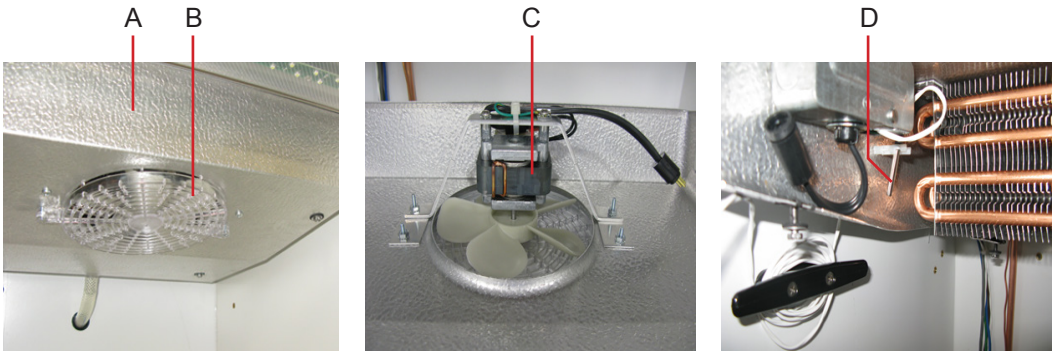
10.4.1 Lighting



Light features (partial views).

Label	Description	Part Number	Schematic Label
A	Light assembly (includes circuit board and cover)	800023-1	P
Not shown	Light cover	-	-

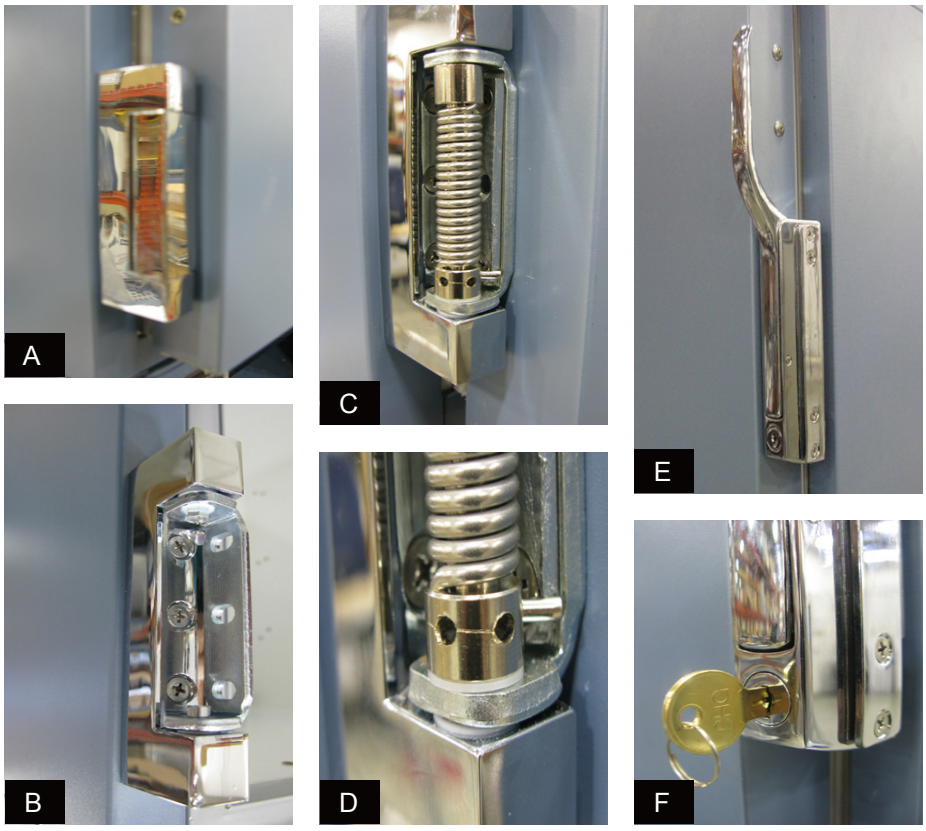
10.4.2 Unit Cooler



Unit cooler interior features.

Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	800130-1	F
B	Fan guard	-	-
C	Unit cooler fan motor	120540	E
D	Temperature control probe	800048-1	IT

10.5 Door and Hinge



Hinge, hinge spring and pin assembly, and door handle with key lock.

NOTE Spring tension is controlled at the point where the pin is stopped by the side plate (C, D).

Label	Description	Part Number
A	Hinge, covered, edge mount	220506
B	Hinge, uncovered, without spring assembly	-
C	Hinge, uncovered, spring and pin assembly	-
D	Close up, hinge spring and pin assembly	-
E	Door handle - Magnetic offset latch with key lock	220426
F	Door key lock with key, close-up	-
Not shown	Door gasket (magnetic)	-
Not shown	Door lock replacement kit	220439

10.6 Side Access Panel

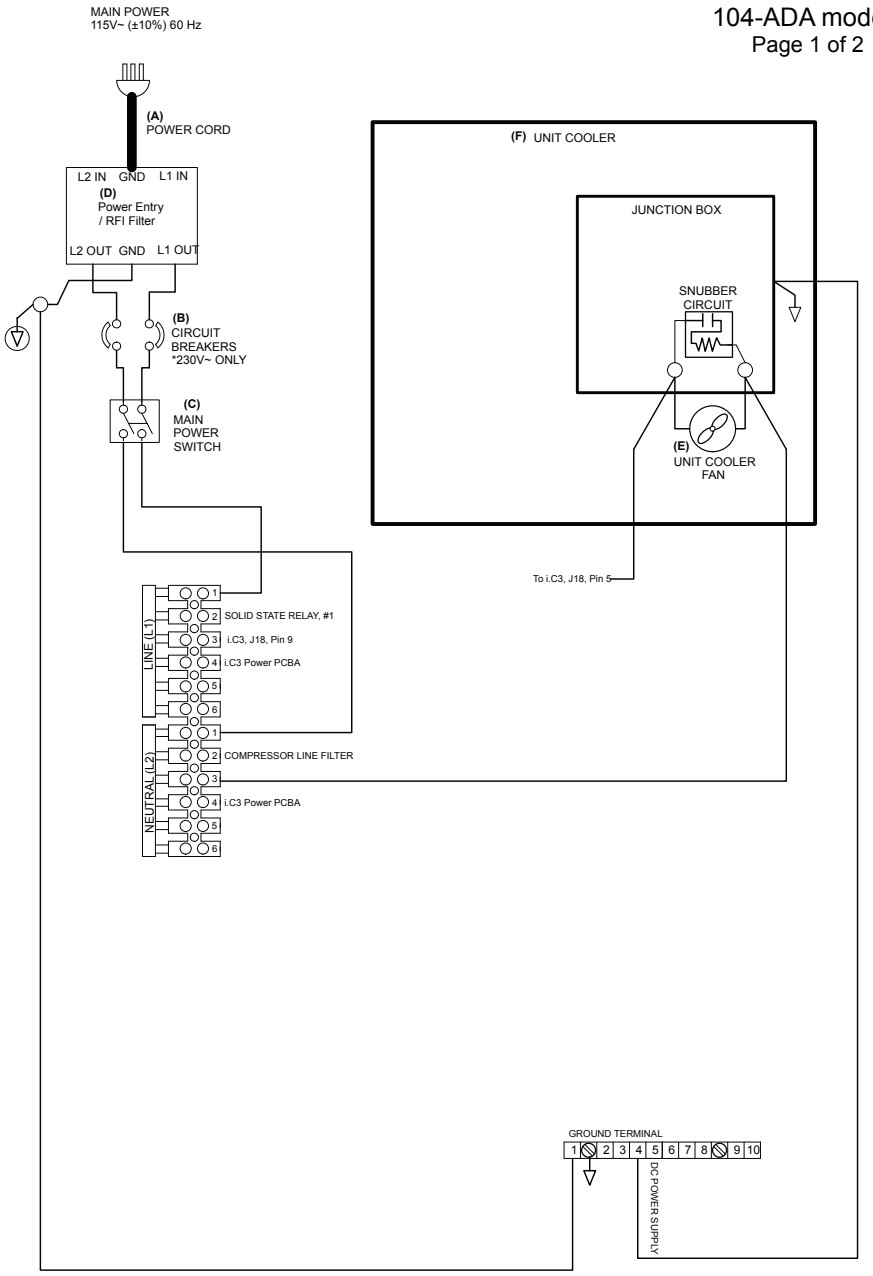
Undercounter refrigerators feature easy access for servicing, removal, and replacement of the compressor and condenser. The compressor is accessible from the rear and the side.

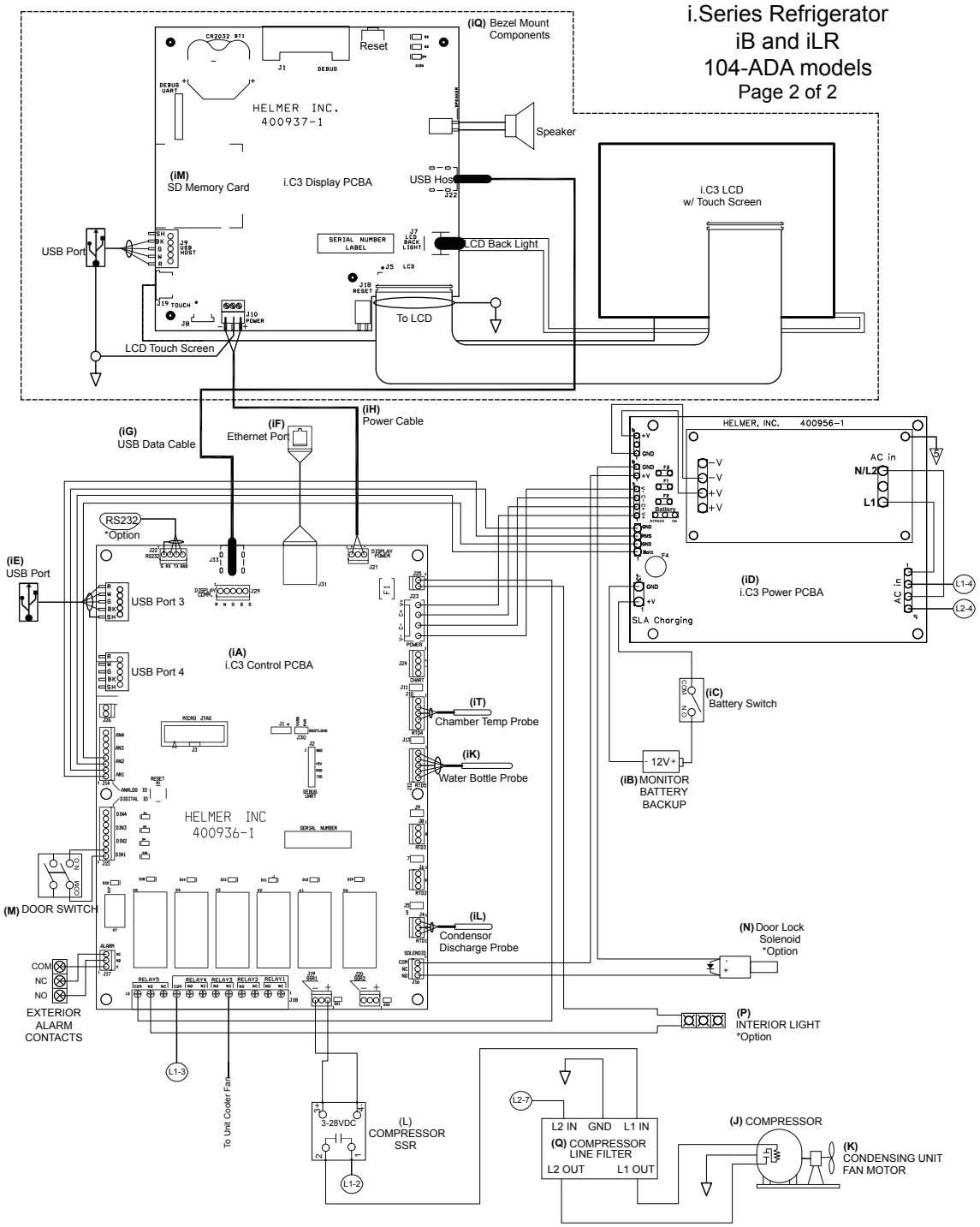
Side access panel.

11 Schematics

11.1 iB and iLR Models; 104 Configuration

i.Series Refrigerator
iB and iLR
104-ADA models
Page 1 of 2




i.Series Refrigerator
iB and iLR
104-ADA models
Page 2 of 2
(iQ) Bezel Mount Components
Reset
HELMER INC.
400937-1
Speaker
(iM)
SD Memory Card
i.C3 Display PCBA
USB Host
i.C3 LCD
w/ Touch Screen
USB Port
SERIAL NUMBER LABEL
LCD Back Light
To LCD
LCD Touch Screen
(iG)
USB Data Cable
(iF)
Ethernet Port
(iH)
Power Cable
HELMER, INC. 400956-1
AC in
N/L2
L1
RS232
*Option
(iE)
USB Port
USB Port 3
USB Port 4
(iA)
i.C3 Control PCBA
(iD)
i.C3 Power PCBA
SLA Charging
AC in
L1-4
L2-4
(iC)
Battery Switch
(iT)
Chamber Temp Probe
(iK)
Water Bottle Probe
- 12V +
(iB) MONITOR
BATTERY
BACKUP
HELMER INC
400936-1
(M) DOOR SWITCH
(iL)
Condensor
Discharge Probe
(N) Door Lock
Solenoid
*Option
COM
NC
NO
EXTERIOR
ALARM
CONTACTS
(P)
INTERIOR LIGHT
*Option
L1-3
To Unit Cooler Fan
3-28VDC
(L)
COMPRESSOR
SSR
L1-2
L2-7
L2 IN GND L1 IN
(Q) COMPRESSOR
LINE FILTER
L2 OUT L1 OUT
(J) COMPRESSOR
(K)
CONDENSING UNIT
FAN MOTOR

Section III: Horizon Series™ Models

12 Product Configuration

12.1 Install Battery for Backup Power

The monitoring system has a battery system, enabling a period of continuous operation if power is lost.

NOTE The monitoring system will start on battery power alone. If the refrigerator was previously not connected to AC power and the battery is connected, the monitoring system will begin running on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, and no battery-related alarms are active, backup power for the monitoring system is available for up to 2 hours.

CAUTION

- ► Before installing or replacing batteries, switch the power OFF. Disconnect the refrigerator from AC power.
- ► When installing a replacement battery, use only a battery which meets the specifications outlined in chapter **14.7** (Supplies).

The the battery is located below the chamber, behind the front cover. The battery holder is located behind an access panel.

Models	Battery
HB and HLR	(1) non-rechargeable 9 V lithium (or equivalent) battery

Battery is taped next to the battery holder. Install and connect the battery to provide monitoring system with backup power in the event of AC power failure.

12.2 External Monitoring Devices

The remote alarm interface is a relay switch with 3 terminals:

- ► Common (COM)
- ► Normally Open (NO)
- ► Normally Closed (NC)

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used.

Requirements for your alarm system determine which alarm wires must connect to terminals.

NOTE Do not connect any monitoring device that exceeds the maximum load capacity.

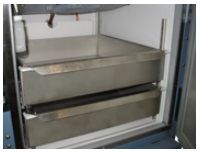
The terminals on the remote alarm interface have the following maximum load capacity:

- ► 0.5 A at 125 V (AC): 1 A at 250 V (DC)

12.2.1 Connect to Remote Alarm Interface

1. Switch AC ON/OFF switch OFF. Disconnect the battery.
2. On the electrical box, locate the remote alarm terminals.
3. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
4. Use a cable tie to relieve strain on alarm wires (as necessary).
5. Switch AC ON/OFF switch ON. Reconnect the battery.
6. Press the **Mute** button to disable the high temperature alarm while refrigerator reaches operating temperature.

12.3 Move Drawers, Shelves, and Baskets



Storage features.

CAUTION

- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum basket, drawer, or shelf load is 100 lbs (46 kg).

NOTE Before moving storage components, protect stored items in refrigerator from extended exposure to adverse temperature.

Remove a Drawer or Basket

1. Pull drawer or basket out until it stops.
2. Tilt the front of the drawer or basket upward.
3. Pull drawer or basket free of the slides.

Install a Drawer or Basket

1. Align end guides on drawer or basket with the slides.
2. Gently push drawer or basket into chamber until it stops.
3. Pull drawer or basket out until it stops; check for smooth operation.

Remove a Shelf

1. With one hand, lift front edge of the shelf from the front brackets.
2. With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a Shelf

1. Insert shelf into chamber, placing it on brackets.
2. Gently bump rear edge of the shelf downward to engage brackets.
3. Pulling shelf forward gently; shelf should not disengage from rear brackets.

12.4 Move Slides and Brackets

Remove Drawer Slides

1 Using a screwdriver, remove front bracket retainers.
2 Tap front brackets upward to disengage standards.
3 Remove slides from standards.

Install Drawer Slides

1 Insert slides into standard at appropriate height.
2 Tap front brackets downward to engage standards.
3 Using a screwdriver, install front bracket retainers.

Remove Shelf Brackets

1 Using a screwdriver, remove front bracket retainers.
2 Tap front brackets upward to disengage standards.
3 Remove front brackets from standards.

Install Shelf Brackets

1 Insert front brackets into standard at appropriate height.
2 Tap front brackets downward to engage standards.
3 Using a screwdriver, install front bracket retainers.

12.5 Level the Refrigerator

NOTE

- ► Leveling feet are optional.
- ► Helmer recommends the use of leveling feet.
- ► A bubble level may be used to ensure the refrigerator is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-Back

1 Using a wrench, raise or lower leveling feet.
2 When refrigerator is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-Side

1 Using a wrench, raise or lower leveling feet.
2 When refrigerator is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

12.6 Optional Adapter Kits for Medication Dispensing Locks

Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing locks.

12.7 Reverse Door Hinge and Handle

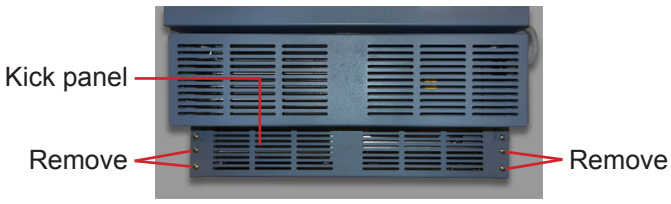
NOTE

- ► Before reversing door hinge and handle, protect stored items in refrigerator from extended exposure to adverse temperature.
- ► Refrigerator must be on the floor or on an elevated work surface with enough space in front of the refrigerator to lay the door face-down for disassembly.
- ► To reverse the door hinge and handle on refrigerators equipped with Access Control, a handle specific to the opposite side must be installed. Contact Helmer Technical Service to order a replacement handle.

12.7.1 Remove the Door and Hinges

1 Open the lower front control panel. Switch AC ON/OFF switch OFF. Disconnect the battery.

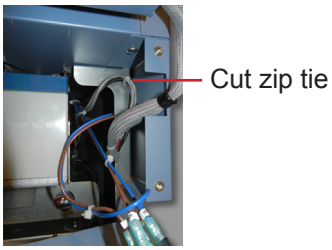
2 Remove 4 screws holding the kick panel on the cabinet. Set the kick panel aside.



3 Remove 6 screws holding the access panel and cover on the cabinet. Lay the panel in front of the cabinet, ensuring there is no strain on the power switch wires.

4 Remove plug from the access panel (on the handle-side of the refrigerator). Remove grommet from the hole (on the hinge-side of the refrigerator). Slide the braided sleeve out of the slot (on the kick plate).

5 Cut the zip tie inside the cabinet.



6 Remove the door handle assembly.

Without Access Control:

a Remove 4 screws holding the door handle assembly on the door.

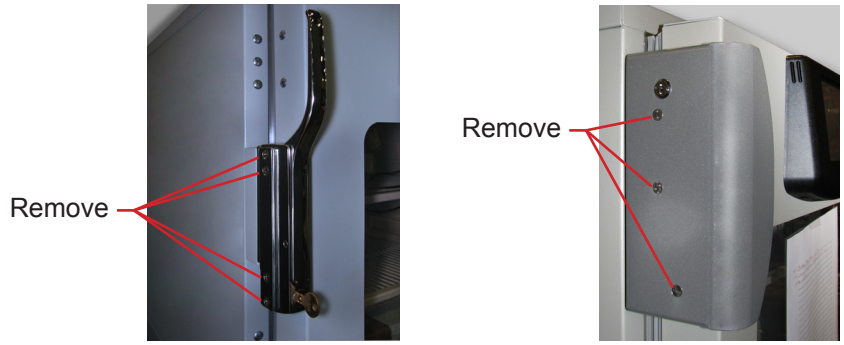
b Set the door handle assembly aside.

With Access Control:

a Remove 3 screws holding the door handle assembly on the door.

b Separate the spade connectors for the Access Control lock.

c Set the door handle assembly aside.



Left: Door handle assembly (without Access Control option). Right: Door handle assembly (with Access Control option).

7 Remove door latch / door catch.

Without Access Control:

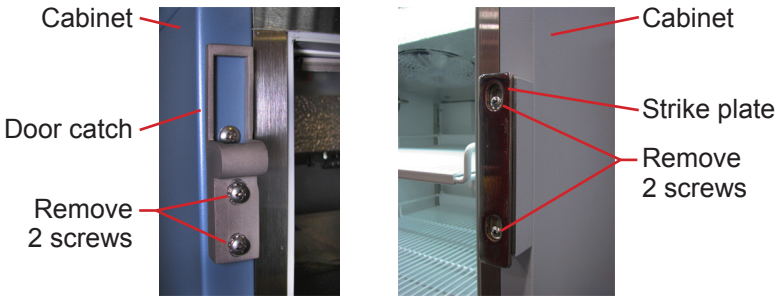
a Remove 2 screws holding the door latch plates and spacer bar on the cabinet

b Set the latch plates and spacer bar aside.

With Access Control:

a Remove 2 screws holding the door catch on the cabinet.

b Set the door catch aside.



Left: Door latch plates (without Access Control option). Right: Door catch (with Access Control option).

8 With the door shut, remove the cover plate from both hinges.

9 Remove the spring assembly from the lower hinge.

a Use a J-hook tool to engage the left-most hole in the spring cap and rotate the spring cap from *left to right,* and hold.

b Remove the pin from the spring cap.

c Allow the spring to relax.

d Use a J-hook tool to engage any hole in the spring cap compress spring downward.

e Remove spring assembly from the lower hinge.

f Set the spring assembly aside.

NOTE

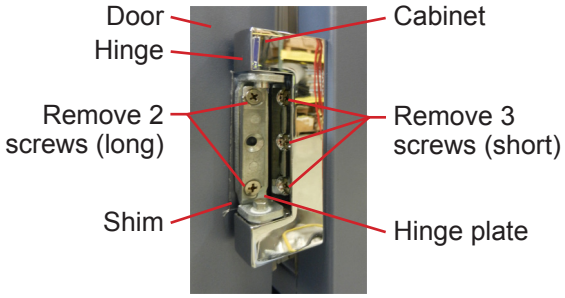
- A second person should assist by supporting the door while the hinges are removed.
- The 2 screws holding the hinge on the door are longer than the 3 screws holding the hinge on the cabinet. The screws must be installed in the same location when moving the hinge to the opposite side of the door.

10 Remove the lower hinge.

- **a** Support the door.
- **b** Remove 5 screws attaching the lower hinge to the door and cabinet.
- **c** Remove the lower hinge.
- **d** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **e** Set the lower hinge aside.
- **f** Continue to suppor the door.

11 Remove the upper hinge.

- **a** Remove 5 screws attaching the upper hinge to the door and cabinet.
- **b** Remove the upper hinge.
- **c** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **d** Set the upper hinge aside.



Hinge removal (lower hinge shown with spring removed).

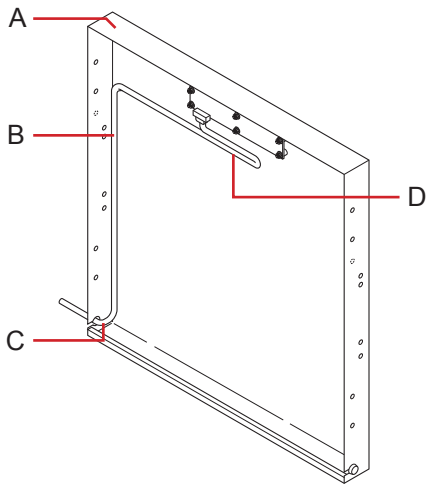
12 Lay the door face-down in front of the cabinet. Ensure that there is no strain on the cable(s) passing from the cabinet to the door.

12.7.2 Reverse the Cable Routing in the Door

The undercounter door consists of an inner frame and outer frame. The power cable and communication cable are connected to the display circuit board on the front of the door.

The length of the cables inside the door is approximately 3 feet. The cables follow a channel along the top and side of the outer frame. Additional slack has been bundled in the cables.

If the refrigerator is equipped with the Access Control option, a third cable will be included.

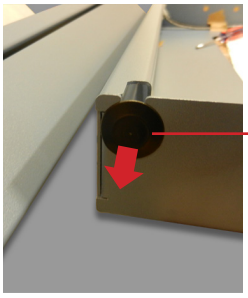


Outer door frame (right-hinged solid door shown) and data cable.

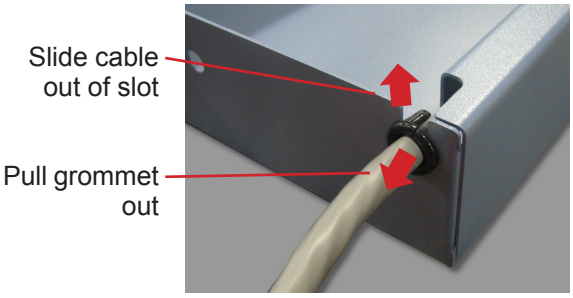
Label	Description
A	Outer door frame
B	Data cable (gray)
C	Cable exit (corner of door)
D	Additional cable slack

1 Lay the door assembly face-down on a solid work surface.
2 Remove remaining screws from both sides of the door assembly.
3 Lift the inner door frame out of the outer door frame and set aside. A J-hook tool may be used along the bottom edge of the door assembly to lift the inner frame.

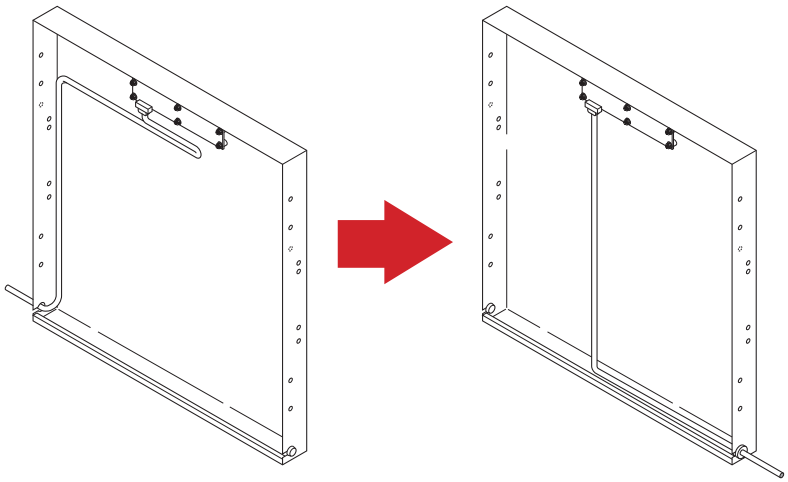
4 Remove the plug from the handle-side of the door. Set the plug aside.



5 Pull the grommet out of the hole in the door. Slide the data cable out of the slot.



6 Re-route the data cable.
- **a** Route cable inside the door and out through the slot in the corner opposite from where the cable had previously exited the door.
- **b** Cable should follow the bottom edge of the door frame, as closely as possible.
- **c** Tape the cable to the door frame.
- **d** Excess slack in the cable should be outside of the door.
- **e** If the refrigeratoris equipped with the Access Control option, reverse the installation of the Access Control power cable and tape the cable to the door frame. Use a hammer and center punch to open the knockout hole that the Access Control cable will run through.



Left: Original cable routing (right-hinged door). Right: New cable routing (left-hinged door).

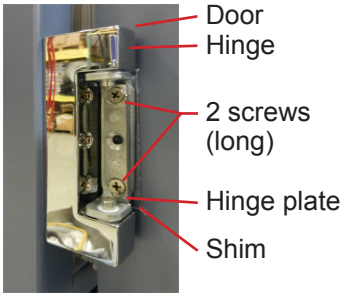
7 Route the data cable out of the door.
- **a** Slide the data cable through the slot in the door.
- **b** Insert the door-side grommet into the hole in the door.

8 Reinstall the inner door frame inside the outer door frame. Install screws in the unused holes on the door where hinges were originally installed.

12.7.3 Reinstall the Door and Hinges

1 Install the hinges and hinge plates on the door.
- **a** Hand-thread 2 screws through each hinge and into the door.
- **b** Leave the screws slightly loose.
- **c** If a shim was used on the lower hinge, transfer the shim to the new hinge location.

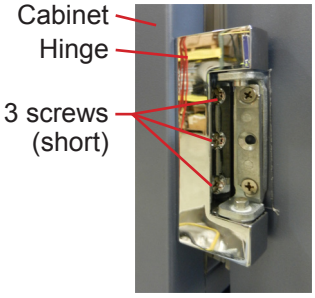
NOTE Ensure that the upper and lower hinges are not interchanged when moving the hinges to the opposite side of the door.



Attach hinge to door (lower hinge shown).

NOTE A second person should assist by supporting the door while the hinges are installed.

2 Install the door on the cabinet.
- **a** Lift the door to the cabinet.
- **b** Align the holes in the hinges with the corresponding holes in the cabinet.
- **c** Hand-thread 3 screws through each hinge and into the cabinet.
- **d** Do not allow the weight of the door to rest on the hinges.

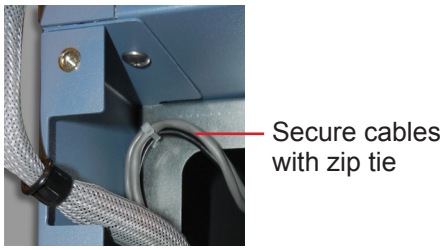


Attach hinge to cabinet (lower hinge shown).

3 Align the door and tighten screws.
- **a** Support the door so the top edge of the door is level.
- **b** Level the door using a shim if necessary.
- **c** Tighten all screws attaching both hinges to the door and to the cabinet.

NOTE If a shim is necessary to level the door after hinge reversal, contact Helmer Technical Service to obtain a shim.

4 Route the power and communication cables (and Access Control cable, if equipped) across the front of the cabinet. Attach the cables to the zip tie holder under the cabinet on the hinge side.



Power and communication cables secured at the hinge-side of the cabinet after hinge reversal.

5 Install the cable in the door.
   - **a** Slide the braided sleeve through the slot in the access panel.
   - **b** Install the grommet in the hole.
   - **c** Install the plug in the access panel on the opposite side.
   - **d** Allow enough slack (approximately 3”) in the braided sleeve between the door and the cabinet so the door can pivot open and closed without straining the cable.

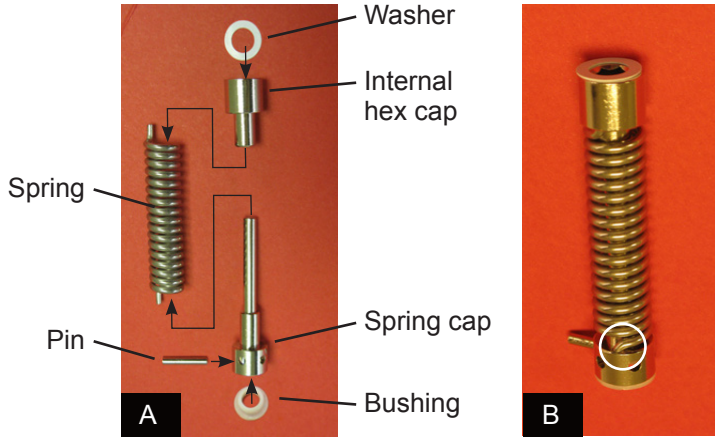
6 Install the access panel and cover.

7 Install the kick panel.

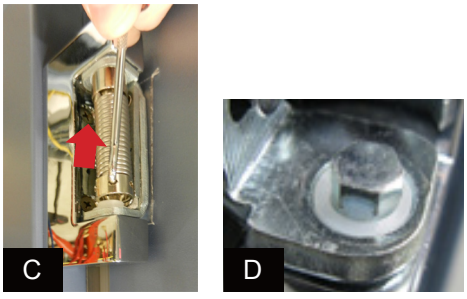
8 Install the door handle on the opposite side of the door. For models equipped with the Access Control option, reconnect the spade connectors for the Access Control lock.

9 Install the latch plates and spacer bar on the opposite side of the cabinet. If the refrigerator is equipped with the Access Control option, install the catch on the cabinet.

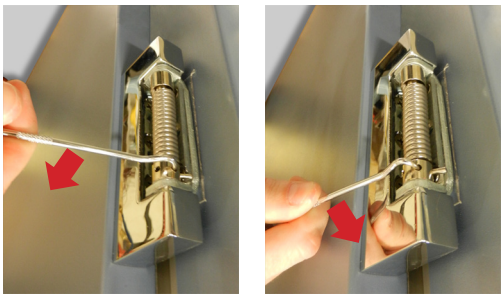
10 Install the hinge spring and pin assembly.
   - **a** Close the door.
   - **b** Assemble the hinge spring assembly for the left side of the door (Figure A).
   - **c** Orient the bend in the coil toward the front of the refrigerator (Figure B).
   - **d** Slide the internal hex cap (with washer) on to the upper hex bolt in the lower hinge.



   - **e** Use a J-hook tool in the spring cap to to compress the spring upward *(Figure C)*.
   - **f** While compressing the spring, slide the spring cap over the lower hex bolt in the lower hinge *(Figure D)*.



   - **g** Use a J-hook tool to engage the right-most hole in the spring cap and rotate the spring cap from *right to left,* and hold.
   - **h** Count 4 holes, starting from and including the spring cap hole closest to the end of the coil.
   - **i** Insert the pin in the fourth hole.



Rotate the spring using a J-hook tool then insert pin (left-hinged door shown).

11 Switch AC ON/OFF switch ON. Reconnect the battery.
12 Close the lower front control panel.
13 Press the **Mute** button to disable the high temperature alarm while refrigerator reaches operating temperature.
14 Verify the door is level and the hinges operate smoothly and the door seals tightly.
15 On models equipped with the Access Control option, adjust the catch on the refrigerator cabinet to engage the Access Control latch on the door.
- **a** Latch should engage the catch on the refrigerator cabinet and prevent the door from being opened.
- **b** If the door closes fully but can be opened, adjust the catch on the cabinet *up* to engage the latch.
- **c** If the door does not close fully, adjust the catch down to allow the door to close.

12.8 Stacked Undercounter Units

CAUTION

- ► For a stacked configuration, both units must have leveling feet installed.
- ► The back brace bars and front stabilizing brackets must be installed.
- ► When stacking a refrigerator and freezer (104 and/or 105 models), place the heavier unit on the bottom.
- ► Do not open multiple, loaded drawers or baskets at the same time.

Call Helmer or your distributor for more information on the stacking kit, and for methods to secure both units to the wall and/or the floor.

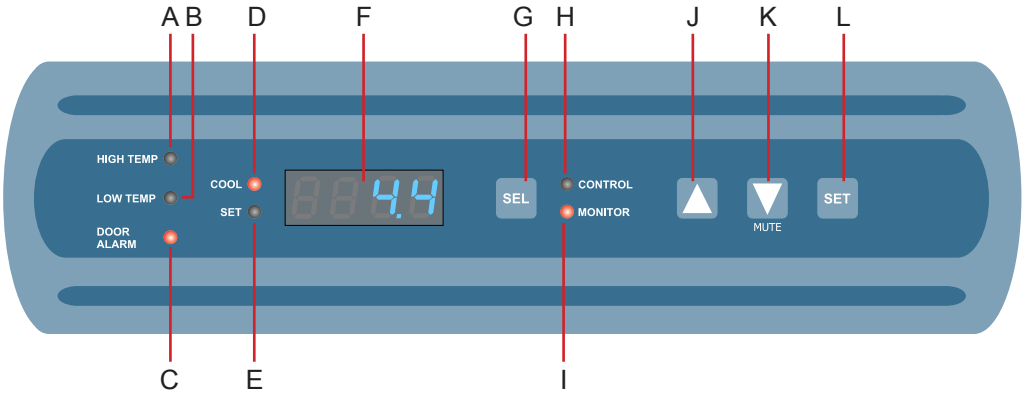
13 Settings

Through the Horizon Series monitoring and control system, current settings may be viewed and changed.

NOTE

- Control Sensor Offset and Hysteresis settings are factory-preset and should not be changed unless directed by Helmer Technical Service.
- Changing temperature settings affects operation of the refrigerator. Do not change settings unless instructed in product documentation or by Helmer Technical Service.

13.1 Monitor and Controller Interface



Label	Description	Function
A	HIGH TEMP lamp	Indicates when the refrigerator is in a high temperature alarm condition. Also indicates high alarm temperature setpoint is being changed.
B	LOW TEMP lamp	Indicates when the refrigerator is in a low temperature alarm condition. Also indicates low alarm temperature setpoint is being changed.
C	DOOR ALARM lamp	Indicates when the door is open.
D	COOL lamp	Indicates the compressor is running.
E	SET lamp	Indicates when temperature setpoint or alarm setpoint is being changed.
F	Display	Displays real-time temperature information, setpoints, and alarms.
G	SEL button	Toggles between alarm monitor and control modes.
H	CONTROL lamp	Indicates when the reading from the temperature probe is displayed.
I	MONITOR lamp	Indicates when the display is showing temperature readings from the chamber probe. Also indicates when alarm setpoints are being changed.
J	UP ARROW button	Increases a temperature setting.
K	DOWN ARROW / MUTE ALARM button	Decreases a temperature setting. Also mutes the audible alarm for five minutes.
L	SET button	Allows settings to be selected, prior to changing settings.

NOTE The Alarm Disable key switch disables all audible alarms. This switch does not affect alarm lamps or signals sent through the remote alarm interface.

13.2 Refrigerator Setpoint

NOTE Default setpoint is 4.0 ºC.

Change the setpoint if:

- ► Your organization requires a chamber temperature other than 4.0 ºC.
- ► The normal chamber temperature is too high or low (after completing preventive maintenance and applicable troubleshooting tasks).

Confirm:

- ► Refrigerator has been placed per location requirements in the operation manual.
- ► Preventive maintenance has been completed per operation manual.
- ► Troubleshooting items associated with chamber temperature have been reviewed (if necessary).

Change setpoint.

1 Determine the change in value to reach desired setpoint. Adjustment should be the difference between current setpoint and new setpoint.

EXAMPLE

- ► Current setpoint is 4.0 ºC
- ► Target setpoint is 5.0 ºC
- ► Setpoint adjustment value is +1.0 ºC

2 On the monitoring system, press and release **SEL** to change to Control mode. CONTROL lamp will illuminate.

3 Press and hold **SET** to display the reference temperature.

NOTE Reference temperature is typically higher than the chamber temperature.

4 Hold **SET** and press **Up Arrow** and **Down Arrow** as necessary to set the adjustment value determined in step 2.

5 Release all buttons; the setpoint is changed.

6 Press and release **SEL** to return to Monitor mode. MONITOR lamp will illuminate.

13.3 Temperature Alarm Setpoints

View setpoints:

1 Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp will flash to indicate entry into program mode.

2 Press **SEL** until desired setting appears.

3 Observe the setting.

4 To view another setting, press **SEL** again (optional).

5 Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp stops flashing to indicate exit from program mode.

Flashing Lamp	Selected Setting
HIGH TEMP and MONITOR	High Temp alarm setpoint
LOW TEMP and MONITOR	Low Temp alarm setpoint
MONOTOR only	Monitor Offset
CONTROL only	Control Sensor Offset
CONTROL only	Control Hysteresis

13.3.1 High Temperature Alarm

- ► Specifies the temperature at which the High Temperature Alarm activates.
- ► Default setpoint is 5.5 ºC.
- ► Setpoint can be changed from -40.0 ºC to +25.0 ºC.

Change the setpoint:

1. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until HIGH TEMP and MONITOR lamps flash.
3. Hold **SET**, then press **Up Arrow** or **Down Arrow** to change the setpoint.
4. Release **SET** button.
5. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp stops flashing to indicate exit from program mode. New settings are saved.

13.3.2 Low Temperature Alarm

- ► Specifies the temperature at which the Low Temperature Alarm activates.
- ► Default setpoint for HB (blood bank) models is 1.5 ºC.
- ► Default setpoint for HLR and HPR (laboratory and pharmacy) models is 2.0 ºC.
- ► Setpoint can be changed from -40.0 ºC to +25.0 ºC.

Change the setpoint:

1. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until LOW TEMP and MONITOR lamps flash.
3. Hold **SET**, then press **Up Arrow** or **Down Arrow** to change the setpoint.
4. Release **SET** button.
5. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp stops flashing to indicate exit from program mode. New settings are saved.

13.4 Temperature Calibration Setpoints

View setpoints:

1. Hold Up Arrow and Down Arrow for 3 seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press SEL until desired setting appears.
3. Observe the setting.
4. To view another setting, press SEL again (optional).
5. Hold Up Arrow and Down Arrow for 3 seconds. MONITOR lamp stops flashing to indicate exit from program mode.

Flashing Lamp	Selected Setting
HIGH TEMP and MONITOR	High Temp alarm setpoint
LOW TEMP and MONITOR	Low Temp alarm setpoint
MONOTOR only	Monitor Offset
CONTROL only	Control Sensor Offset
CONTROL only	Control Hysteresis

13.4.1 Monitor Offset

- ► Adjust if temperature displayed on the monitor does not match measured chamber temperature.
- ► Value is factory-set to match an independent thermometer.
- ► Value can be changed from -10.0 ºC to +10.0 ºC.

NOTE

- ► If the variance is within acceptable limits, changing the offset value is optional.
- ► Probes in the bottle are connected to the monitoring system and sense chamber temperature. These probes do not affect refrigerator setpoint.

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards.
- ► Tape, to attach thermometer to temperature probe.

Measure the chamber temperature:

1. Remove the probe from the probe bottle.
2. Unscrew the cap from the bottle.
3. Tape the thermometer to the temperature probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Close the door and allow the chamber temperature to stabilize for 10 minutes.
5. Observe and note the thermometer temperature.
6. Lower the Offset Value to lower displayed monitor temperature; raise the Offset Value to raise displayed monitor temperature.

EXAMPLE

- ► Measured temperature (at the probe bottle) is 4.0 ºC
- ► Displayed temperature is is 4.5 ºC
- ► Offset adjustment value is +0.5 ºC

7. Remove thermometer and probe from bottle and remove tape.
8. Replace the probe in probe bottle.
9. Replace bottle cap, ensuring a tight fit.
10. Place the probe in bottle, immersing at least 2” (50 mm).

Enter the new offset value:

1. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until only the MONITOR lamp flashes.
3. Hold **SET**, then press **Up Arrow** or **Down Arrow** to change the setpoint.
4. Release **SET** button.
5. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp stops flashing to indicate exit from program mode. New settings are saved.

13.4.2 Control Sensor Offset

- ► Controls chamber temperature.
- ► Factory-preset.
- ► Varies for each refrigerator.

Determine control sensor offset:

NOTE Control Sensor Offset is factory-preset and should not be changed unless directed by Helmer Technical Service.

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards.
- ► Tape, to attach thermometer to temperature probe.

Measure the chamber temperature:

1. Remove probes from probe bottle.
2. Unscrew cap from bottle.
3. Tape independent thermometer to temperature probe and place in bottle. Probe and thermometer should be immersed at least 2” (50 mm).
4. Close door and allow chamber temperature to stabilize for 10 minutes.
5. Observe independent thermometer temperature for 10 minutes and determine temperature range.
6. From the range, calculate the average temperature.
7. Remove thermometer and probe from bottle and remove tape.
8. Replace bottle cap, ensuring a tight fit.
9. Place probes in bottle, immersing at least 2” (50 mm).
10. Determine the change in value to reach desired setpoint.

EXAMPLE

- ► Measured temperature (at the probe bottle) is 4.0 ºC
- ► Current setpoint is 4.5 ºC
- ► Offset adjustment value is +0.5 ºC

Enter the new offset value:

1. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until only the CONTROL lamp flashes.

NOTE

- ► Ensure Control Sensor Offset is being changed, and not Hysteresis.
- ► Control Sensor Offset and Hysteresis have the same visual indicator.

3. Hold **SET**, then press **Up Arrow** or **Down Arrow** to change the setpoint.
4. Release **SET** button.
5. Hold **Up Arrow** and **Down Arrow** for 3 seconds. CONTROL lamp stops flashing to indicate exit from program mode. New settings are saved.

13.4.3 Hysteresis

- ► Default setpoint is 1.2 ºC for max uniformity models.
- ► Default setpoint is 0.5 ºC for low humidity models.
- ► Allowable temperature variance on each side of the refrigerator setpoint.

NOTE Hysteresis is factory-preset and should not be changed unless directed by Helmer Technical Service.

13.5 Test Alarms

Test alarms to ensure they are working correctly. The refrigerator has alarms for chamber temperature, power failure, and door open (time).

NOTE Before testing alarms, protect items in refrigerator from extended exposure to adverse temperature.

13.5.1 Chamber Temperature Alarm

IMPORTANT Perform the low alarm test before the high alarm test to control the temperature more closely and complete the testing more quickly.

Obtain:

- ► (1) 8 oz (250 ml) glass half-full of chilled water.
- ► (1) glass filled with crushed ice.
- ► (1) 8 oz (250 ml) glass half-full of warm water.

NOTE Temperature probes are fragile; handle with care.

Test the low alarm:

1. Identify setting for low alarm setpoint.
2. Remove chamber temperature probe from bottle.
3. Immerse probe in chilled water.
4. While stirring probe in chilled water, add approximately 1 teaspoon (5 ml) of ice every 20 seconds. Ensure probe is at the bottom of the glass.
5. When low temperature alarm sounds, note the temperature on the monitoring system display.
6. Compare the temperature at which the alarm sounds to the low alarm setpoint. If values do not match, refer to chapter **15** (Troubleshooting).

Test the high alarm:

1. Identify setting for high alarm setpoint.
2. While stirring probe in chilled water, add warm water so temperature increases 0.5 ºC per minute.
3. When high temperature alarm sounds, note the temperature on the monitoring system display.
4. Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to chapter **15** (Troubleshooting).
5. Remove probe from warm water.
6. Place temperature probe in probe bottle, immersing it at least 2” (50 mm).

13.5.2 Power Failure Alarm

1. Switch AC ON/OFF switch OFF. Audible power failure alarm will activate immediately and “PoFF” (power off) will appear on the display.
2. Switch AC ON/OFF switch ON. Audible power failure alarm will cease and “PoFF” will clear from the display.

13.5.3 Door Open Alarm

- ► Factory-set to 3 minutes.
- ► Value can not be changed.

Test the alarm:

1. Open refrigerator door and note the time.
2. After 3 minutes, audible alarm will activate and DOOR ALARM lamp will flash.
3. Close refrigerator door. Audible door open alarm will cease and DOOR ALARM lamp will stop flashing.

14 Maintenance

NOTE

- ► Refer to the operation manual for the preventive maintenance schedule.
- ► Before performing maintenance, protect items in refrigerator from extended exposure to adverse temperature.
- ► Allow refrigerator temperature to stabilize at setpoint after performing service or after extended door opening.

14.1 Recharge Refrigerant

CAUTION

- ► Review all safety instructions prior to recharging refrigerant. Refer to chapter **2** (Safety).
- ► Maintenance should only be performed by trained refrigeration technicians.

NOTE Use only non-CFC R-134A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Power Requirements	Initial Charge
104-ADA model	115 V	4.5 oz (128 g)

Obtain:

- ► Refrigerant
- ► Calibrated pressure gauge (0 lbs/in² to 25 lbs/in² (0 kPa to 175 kPa))

Add refrigerant:

1 Attach pressure gauge to the fittings on the refrigeration lines.
2 Monitor the low side (suction) pressure through a full compressor cycle.
3 Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant so the low side pressure is within acceptable range (12 lbs/in² to 14 lbs/in² (83 kPa to 97 kPa)).
5 Remove pressure gauge.

14.2 Check Monitoring System Battery

The monitoring system does not indicate the charge level of the battery. Regularly test the battery. Replace battery if the test fails or if the battery has been in use for 1 year.

Test the battery:

1 Switch the AC ON/OFF switch OFF.
  a Display should continue to display information.
  b If the display is blank, replace battery.
2 Switch AC ON/OFF switch ON.

NOTE Use a battery which meets specifications outlined in chapter **14.7** (Supplies).

14.3 Replace LED Lamp Strip

NOTE The display assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Refer to chapter 2 (Safety) prior to replacing the display assembly.

1 Switch battery switch OFF. Switch AC ON/OFF switch OFF.
2 Using a screwdriver, detatch lamp strip from chamber.
3 Unsnap the defective lamp strip and disconnect wires.
4 Connect new lamp strip to the wires.
5 Reattach lamp strip to chamber.
6 Switch AC ON/OFF switch ON Switch battery switch ON.
7 Press the **Mute** button to disable the high temperature alarm while refrigerator reaches operating temperature.

14.4 Clean the Refrigerator

14.4.1 Condenser Grill

CAUTION Disconnect refrigerator from AC power when cleaning.

In environments where refrigerator is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

14.4.2 Exterior

Clean glass surfaces with soft cotton cloth and glass cleaner. Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

14.4.3 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

14.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

14.4.5 Clean and Refill Probe Bottle

NOTE A kit that includes a probe bottle and glycerin is available from Helmer.

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz (120 ml) of product simulation solution per bottle
  - ► 10:1 ratio of water to glycerin

Clean and refill bottle:

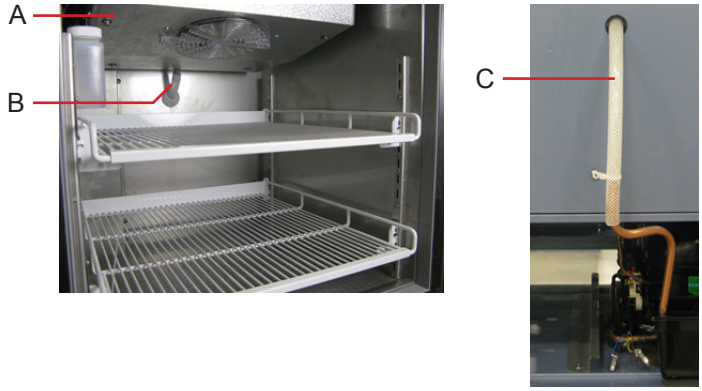
1 Remove probe from bottle.
2 Remove bottle from bracket.
3 Clean bottle with water-bleach solution.
4 Fill bottle with 4 oz (120 ml) of product simulation solution.
5 Cap bottle tightly to minimize evaporation.
6 Place bottle in bracket.
7 Replace probe, immersing at least 2” (50 mm).

14.5 Unit Cooler Cover Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and refrigerator’s inability to maintain temperature.

Required tools:

► 5/16” socket wrench
► Tool to push putty away from the drain hose



Drain line and hose.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain hose

14.5.1 Remove the Unit Cooler Cover

1 Switch AC ON/OFF switch OFF. Disconnect the battery.
2 On the back of the cabinet, peel the putty back to expose the drain hose (C).
3 Remove top drawer, basket, or shelf from the chamber.
4 Remove drain hose from unit cooler drain port (B).
  a Pull drain hose downward to separate from unit cooler.
  b Twist drain hose while pulling to assist in removal.
5 Push the drain hose (C) out through rear of chamber.
6 Remove the unit cooler cover.
  a Hold unit cooler cover in place to prevent it from dropping.
  b Use the socket wrench to remove 4 screws securing the unit cooler cover.
  c Carefully lower unit cooler cover to avoid damage to the fan wiring.

14.5.2 Install the Unit Cooler Cover

1 Verify unit cooler wiring is connected and routed correctly.
   - **a** Wiring should be routed above copper tube inside the unit cooler.
   - **b** Reconnect wires if they have separated.

2 Attach unit cooler cover.
   - **a** Lift unit cooler cover into place.
   - **b** Front edge of the cover should be behind the unit cooler case.
   - **c** Use the socket wrench to install 4 screws to secure the unit cooler cover.

3 Insert the drain hose through hole in the refrigerator.
   - **a** Push drain hose upward, toward the unit cooler drain port.
   - **b** In the chamber, push drain hose onto unit cooler drain port.

4 Reinstall top drawer, basket, or shelf if previously removed.

5 On the back of the cabinet, press putty around the drain hose.

6 Switch AC ON/OFF switch ON. Reconnect the battery.

7 Press the **Mute** button to disable the high temperature alarm while refrigerator reaches operating temperature.

14.6 Access Control Cartridge Removal and Installation

The Access Control lock cartridge is a serviceable assembly installed on the refrigerator cabinet.

Required tools:

- ► Needle nose pliers
- ► #10 spanner driver

14.6.1 Cartridge Removal

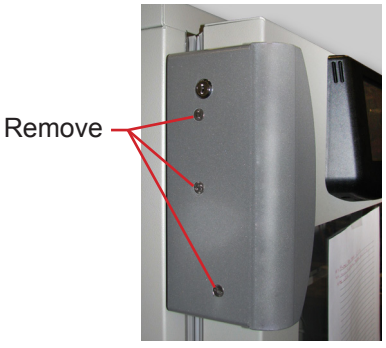
1 Switch AC ON/OFF switch OFF. Disconnect the battery.

2 Open refrigerator door and prop the door open.
   - ► If door is locked, use the key to override the Access Control lock, then open door.

3 Pull the electrical wiring out of the door handle to expose the spade connectors.

4 Separate the two pairs of spade connectors.

5 Use a #10 spanner driver to remove 3 screws securing the door handle and cartridge.



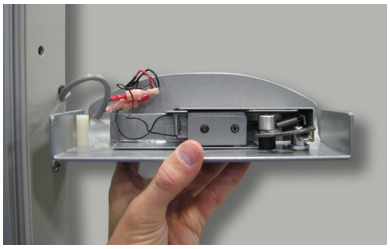
5 Remove the door handle and cartridge.

NOTE

- ► Nylon spacers are installed over the middle and lower screws, between the handle and the door. These spacers will be reused when the new cartridge is installed.
- ► To obtain a #10 spanner driver (part number 220559), Contact Helmer Technical Service.

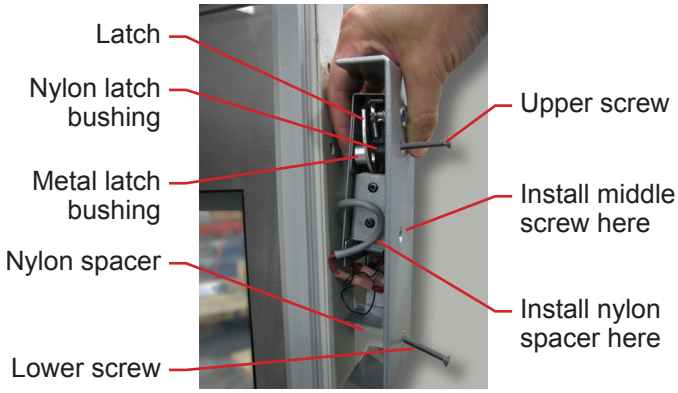
14.6.2 Cartridge Installation

1 Place the cartridge inside the handle.
   ► Align the holes in the cartridge with the holes in the handle.



Access Control cartridge aligned with corresponding holes in the handle.

2 Insert upper screw through:
   a Upper hole in handle
   b Door latch
   c Latch bushings
   d Cartridge body
3 Insert lower screw through:
   a Lower hole in handle
   b Nylon spacer
4 Place the assembly against the door.
   a Align the screw with the corresponding hole in the door.
   b Hand-thread the screw into the hole in the door.



5 Install the middle screw.
   a Use needle nose pliers to hold the nylon spacer inside the door handle.
   b Align nylon spacer with the middle hole in the handle.
   c Insert a screw through the handle and the spacer.
   d Hand-thread screw into the door.
6 Install the lower screw.
   a Use needle nose pliers to hold the nylon spacer inside the door handle.
   b Align nylon spacer with the lower hole in the handle.
   c Insert a screw through the handle and the spacer.
   d Hand-thread screw into the door.

NOTE Ensure the wires will not be pinched between the handle and the door.

7 Use a #10 spanner driver to tighten all 3 screws.
8 Connect the electrical wires from the door to the wires from the cartridge.
   ► Tuck the excess wiring into the door handle.
9 Close refrigerator door.
10 Switch AC ON/OFF switch ON. Reconnect the battery.
11 Touch **Mute** button to disable the high temperature alarm while refrigerator reaches operating temperature.
12 Check for proper engagement of the latch over the catch.
   a Latch should engage the catch on the refrigerator cabinet and prevent the door from being opened.
   b If the door closes fully but can be opened, adjust the catch on the cabinet *up* to engage the latch.
   c If the door does not close fully, adjust the catch down to allow the door to close.

14.7 Supplies

Refrigerant: non-CFC, R-134A

Chart paper: 220366 (52 sheets)

Glycerin solution: 400922-1

(1) 9 V non-rechargeable lithium (or equivalent) battery: 120399

(1) 9 V non-rechargeable alkaline (or equivalent) battery: 120218

15 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).

15.1 General Operation Problems

Problem	Possible Cause	Action
A drawer or basket does not slide easily.	Debris in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of debris. Clean if necessary.
	Drawer slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	Drawer or basket is misaligned or not level.	► Confirm both slides for the drawer or basket are mounted at the same height.
	Drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
A door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Hinge is faulty.	► Confirm the hinge spring or pin is not damaged. Replace entire hinge (lower hinge only), if necessary.
	Lower hinge spring and/or pin may be bent or faulty.	► Replace the entire lower hinge spring and pin assembly.

15.2 Chamber Temperature Problems

Problem	Possible Cause	Action
"Prob" appears on the display, but the chamber temperature is set correctly.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections or replace the probe if necessary.
	A component is faulty.	► Contact Helmer Technical Service.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	Temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	Refrigerator setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature control probe in the unit cooler is faulty.	► Confirm the unit cooler probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Monitor/control board is faulty.	► Confirm the temperature controller or monitor/control board is operating correctly. Replace the board if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Defrost timer is faulty.	► Replace the defrost timer.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the refrigerator setpoint.	Monitor/control board is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace the board if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature monitor/ controller board is faulty.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	The probe bottle is empty.	► Refill the probe bottle.
	Condenser grill is dirty.	► Check the condenser grill. Clean the grill if necessary.
	Air circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the refrigerator is too high.	► Confirm the refrigerator is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

15.3 Alarm Activation Problems

Problem	Possible Cause	Action
The refrigerator is in an alarm condition, but the appropriate alarm is not audible or active.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Alarm Disable key is in the OFF position.	► Turn the Alarm Disable key to the ON position.
	Audible alarms are muted.	► Verify that audible alarms are not muted.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the chamber temperature probe are loose.	► Test the chamber temperature probe connections. Secure the connections if necessary.
	Chamber probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottle is empty.	► Check the level of product simulation solution in the bottle. Clean and refill bottle if necessary.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
The refrigerator is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Circuit breaker is tripped.	► Reset or replace the circuit breaker.
The Door Open alarm is activating sporadically.	Door is not closing completely.	► Clean hinges if debris is present. ► Confirm door is aligned. ► Confirm hinge spring and/or pin are not damaged. Replace hinge (lower only) if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if necessary. ► Confirm refrigerator location meets requirements.
	Condenser alarm setpoint is too low.	► Confirm the alarm setpoint is set at the expected or correct value.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.
	Condenser probe is not calibrated.	► Contact a qualified service technician to confirm the condenser probe is reading correctly and to calibrate the probe if necessary.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Temperature changed slightly around the time of activation.	► No action necessary.

15.4 Condensation Problems

Problem	Possible Cause	Action
There is excessive water in the water evaporation tray inside the lower compartment in the back of the unit.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
There is excessive water in the chamber.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Connection between the unit cooler and the drain tube is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
	Defrost timer bypass switch may be in the ON position.	► Check the defrost timer bypass switch on the circuit board. If in the ON position, switch to the OFF position. If the problem persists, then replace the defrost timer.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
There is excessive moisture on the doors.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around refrigerator is too high.	► Confirm refrigerator location meets requirements.

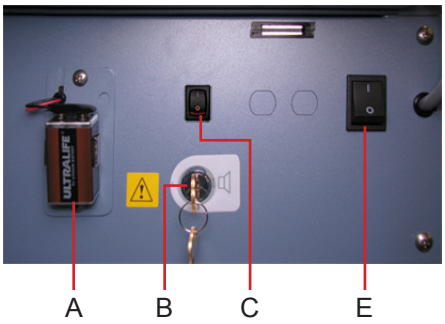
Problem	Possible Cause	Action
Water leaks from the bottom of the refrigerator.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Excessive water is found in the evaporation tray inside the refrigerator.	► Contact Helmer Technical Service to correct issues as necessary.

16 Parts

NOTE

- ► Before replacing parts, protect items in refrigerator from extended exposure to adverse temperature.
- ► Allow refrigerator temperature to stabilize at setpoint after replacing parts or after extended door opening.

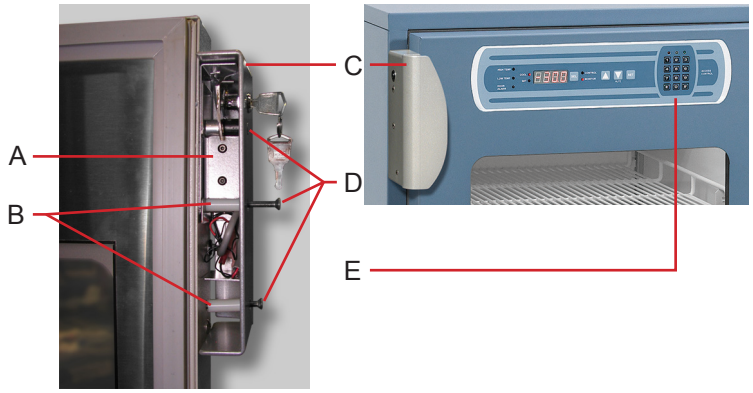
16.1 Front



Lower panel features.

Label	Description	Part Number	Schematic Label
A	Monitoring system backup battery	120399	HH
B	Alarm disable key switch	120227	HD
C	ON/OFF chamber light switch (optional)	120202	HG
D	ON/OFF AC power switch	120478	C

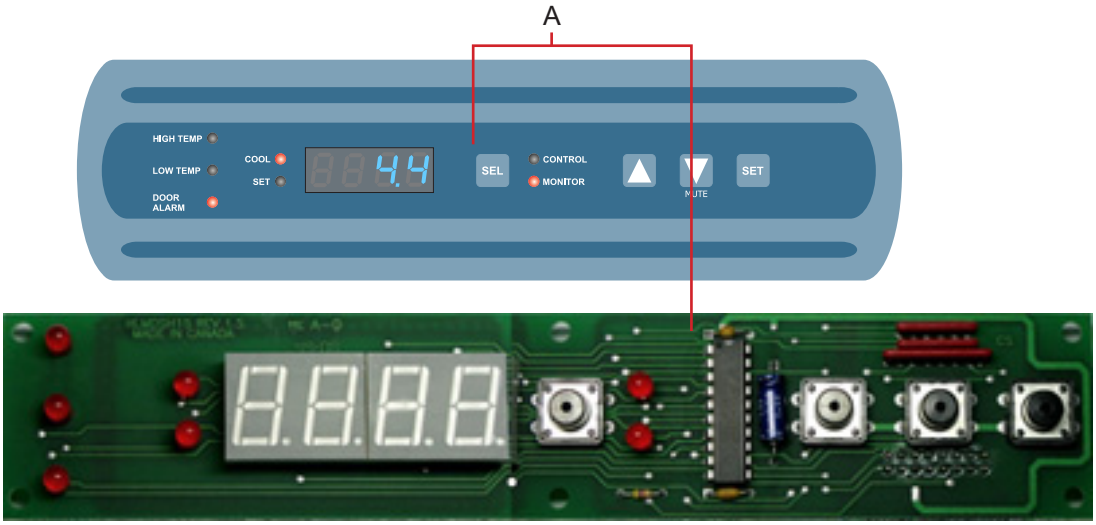
16.1.1 Access Control Option



Optional Access Control door lock, handle, and keypad.

Label	Description	Part Number	Schematic Label
A	Access Control cartridge	Left-hinged door: 400959-1 Right-hinged door: 400959-2	II
B	Nylon spacer	-	-
C	Door handle with keyed lock (lock functions as manual override)	Left-hinged door: 800021-1 Right-hinged door: 800021-1	-
D	Screw	-	-
E	Access control keypad	800007-1	HM

16.1.2 Control System Display



Top: Display with touchpad. Bottom: Display board.

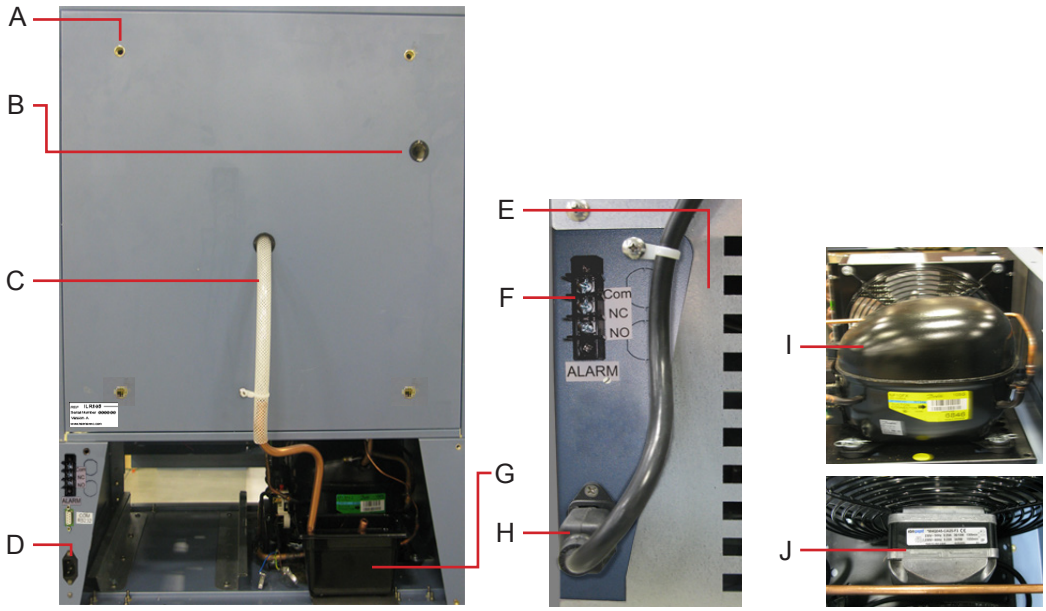
Label	Description	Part Number	Schematic Label
A	Touchpad / display board assembly	400838-1	HI
Not shown	Interface cable	Without Access Control: 400805-2	HL

NOTE The display board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

16.1.3 Control and Monitoring

Label	Description	Part Number	Schematic Label
A	Horizon Series monitoring and control system	-	-
B	Temperature chart recorder (standard on blood bank model, optional on laboratory / pharmacy model)	500612-1	-
C	Chart paper (52 sheets)	220366	-
Not shown	Chart recorder backup battery	120218	-

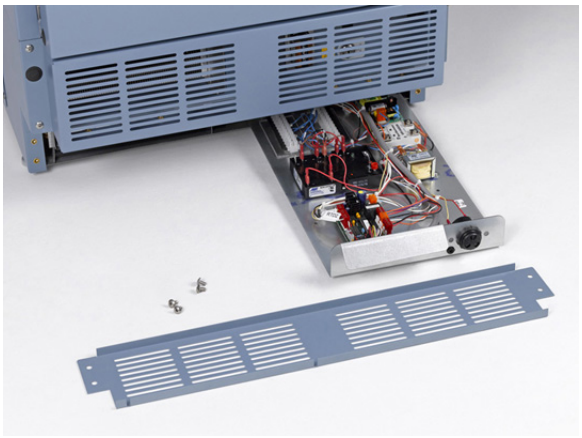
16.2 Rear



Rear features.

Label	Description	Part Number	Schematic Label
A	Nut flanges for brace bars used in stacking undercounter units (two shown)	-	-
B	Rear access port	-	-
C	Drain line	321190-1	-
Not shown	Cover for communication ports and remote alarm contacts	-	-
D	Power connector	-	-
E	Rear cover	321184-1	-
F	Remote alarm contacts	-	-
G	Condensate evaporator tray	-	-
H	Power cable (with connector)	120630	A
I	Compressor	800129-1	J
J	Condenser fan motor	120608	K
Not shown	Caster (optional, swivel with brake)	220467	-

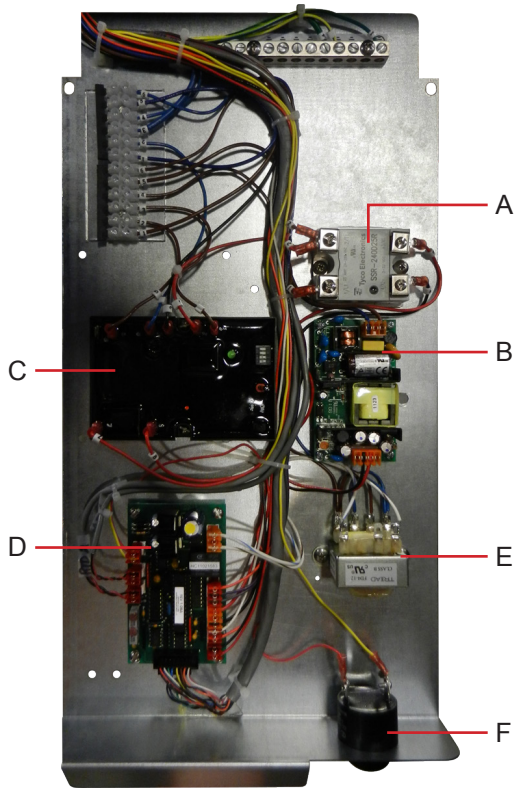
16.3 Electrical Tray



Kick plate (removed). Pull-out electrical components tray (open).

CAUTION Disconnect the refrigerator from AC power before accessing the electrical tray.

16.3.1 Electrical Tray Components



Electrical tray features.

Label	Description	Part Number	Schematic Label
A	Compressor relay	120426	L
B	12 V DC power supply for Access Control (optional) and cabinet lighting	120505	HN
C	Defrost timer	800031-1	HF
D	Control/monitor board	800027-1	HA
E	Temperature control transformer	401097-1	HO
F	Alarm buzzer	120160	HE
Not shown	Power line filter	120299	D

NOTE The control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

16.4 Interior

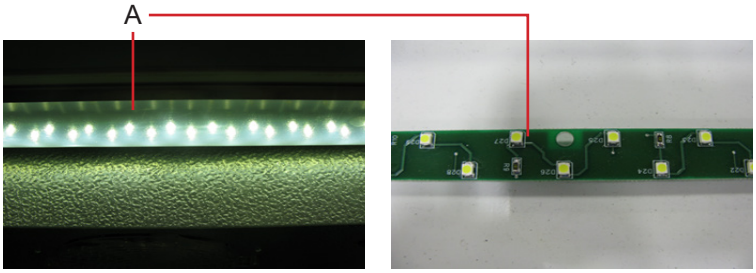
Interior features.

Label	Description	Part Number	Schematic Label
A	Door	**Solid door** Stainless steel with Access Control: 401086-1 Stainless steel without Access Control: 401092-1 Powder coated with Access Control: 401085-1 Powder coated without Access Control: 401091-1 **Glass door (optional)** Stainless steel with Access Control: 401084-1 Stainless steel without Access Control: 401094-1 Powder coated with Access Control: 401083-1 Powder coated without Access Control: 401093-1	-

Label	Description	Part Number	Schematic Label
B	Drawer (blood bank model)	401081-1	-
C	Door switch	120380	M
D	Roll-out basket (optional)	401133-1	-
E	Standard for shelf, drawer, or roll out basket	321638-1	-
F	Chamber temperature probe	800029-1	HC
G	Drawer slide for drawer or roll out basket	400753-2	-
H	Probe bottle and glycerin kit	800132-1	-
I	Shelf (laboratory / pharmacy model)	400814-1	-
Not shown	Optional adapter kit for medication dispensing lock	Call Helmer or your distributor for specific information	-

16.4.1 Lighting

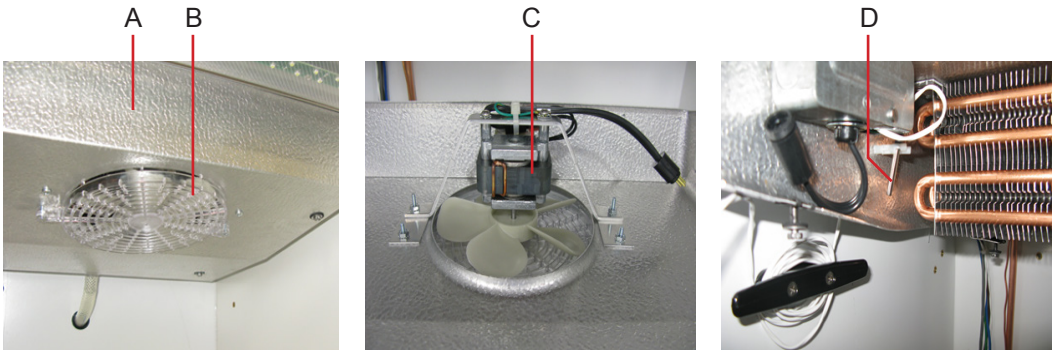
NOTE The chamber light is optional on Horizon Series refrigerators.



Light features (partial views).

Label	Description	Part Number	Schematic Label
A	Light assembly (includes circuit board and cover)	800023-1	P
Not shown	Light cover	-	-

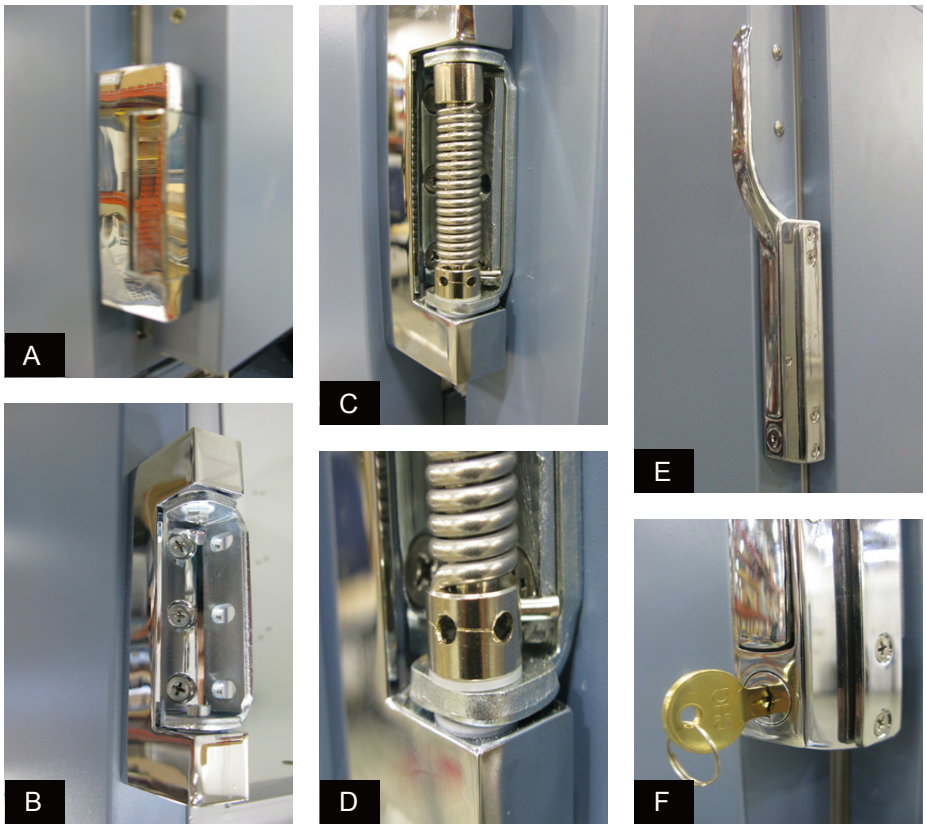
16.4.2 Unit Cooler



Unit cooler interior features.

Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	800130-1	F
B	Fan guard	-	-
C	Unit cooler fan motor	120540	E
D	Temperature control probe	800048-1	IT

16.5 Door and Hinge



Hinge, hinge spring and pin assembly, and door handle with key lock.

NOTE	Spring tension is controlled at the point where the pin is stopped by the side plate (C, D).

Label	Description	Part Number
A	Hinge, covered, edge mount	220506
B	Hinge, uncovered, without spring assembly	-
C	Hinge, uncovered, spring and pin assembly	-
D	Close up, hinge spring and pin assembly	-
E	Door handle - Magnetic offset latch with key lock	220426
F	Door key lock with key, close-up	-
Not shown	Door gasket (magnetic)	-
Not shown	Door lock replacement kit	220439

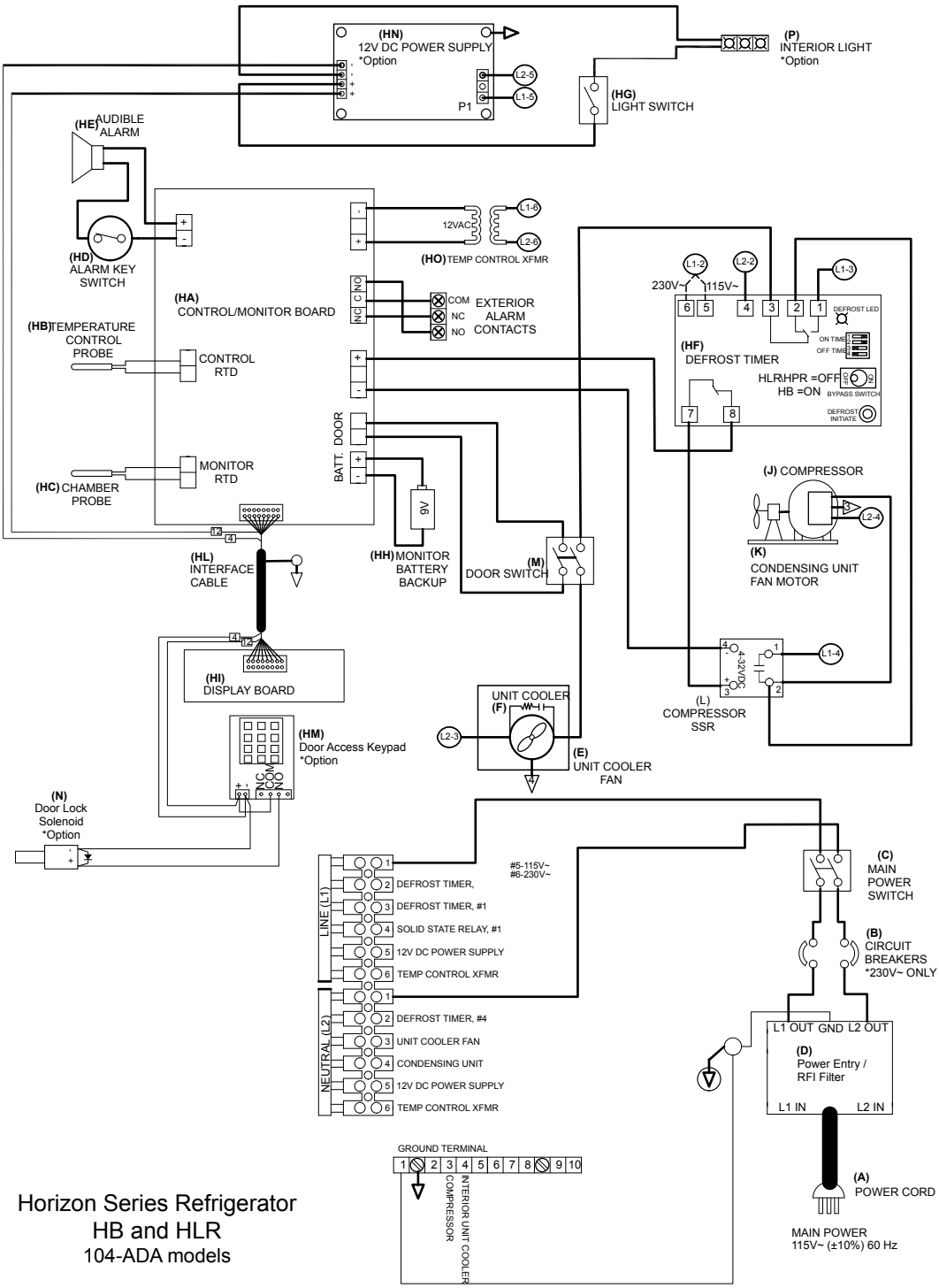
16.6 Side Access Panel

Undercounter refrigerators feature easy access for servicing, removal, and replacement of the compressor and condenser. The compressor is accessible from the rear and the side.

Side access panel.

17 Schematics

17.1 HB and HLR models; 104 configuration



Horizon Series Refrigerator
HB and HLR
104-ADA models

END OF MANUAL

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